DOCUMENT RESUME

ED 307 855 IR 013 821

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TITLE A Learning Assessment System: Development of Assessment Instruments plus Scoring and Reporting Procedures.
INSTITUTION Bureau County Learning Assessment Cooperative, Sheffield, IL.
SPONS AGENCY Illinois State Board of Education, Springfield. Dept. of School Improvement Services.
PUB DATE 89
NOTE 129p.
PUB TYPE Guides - Non-Classroom Use (055) -- Reports - Descriptive (141)

EDRS PRICE MF01/PC06 Plus Postage.
DESCRIPTORS *Computer Assisted Testing; Computer Software; *Computer System Design; *Educational Improvement; *Educational Testing; Elementary Secondary Education; School Districts; Standardized Tests; State Programs; Testing Problems; *Testing Programs; Test Manuals; Test Scoring Machines
IDENTIFIERS *Illinois

ABSTRACT

This manual is intended to provide Illinois school districts with guidance in developing learning assessment plans and using testing materials as part of the school improvement program mandated by the 1985 educational reform legislation for Illinois. Designed primarily to be a series of "how to" booklets, the manual is divided into six major sections: (1) Introduction and Overview (how to read this report, legislative initiative for school improvement, background of the Bureau County Project and Cooperative, and objectives of the project); (2) Local Development of Objective-Directed Instruction and Development (how to operationalize a learning assessment plan for a cooperative of school districts); (3) People, Software, and Hardware (how to and what to acquire as hardware and software); (4) Test Scoring from the Software User's Perspective (how to scan, score, and generate reports); (5) Assessment Results and School Improvement (how to interpret and utilize the assessment results); and (6) Conclusion (brief comments on the experiences of Bureau County during the initial phases of the project and on alternatives to various procedures described in the model). It is noted that all of the chapters focus on how to do all of the above in an integrated manner with maximum efficiency, minimum headaches, and modest expenditures. The text is supplemented by figures and illustrations, and a 6-item bibliography and an index are provided. (EW)

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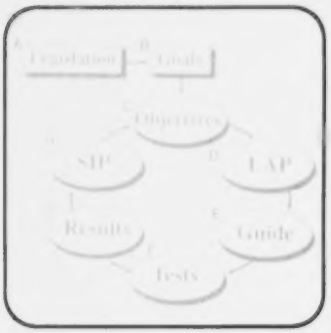
A Learning Assessment System:

Development of Assessment Instruments plus Scoring and Reporting Procedures



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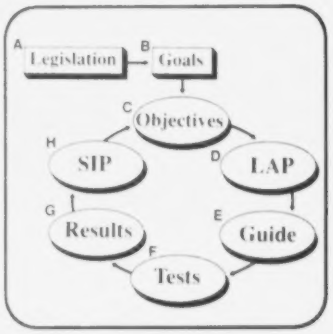

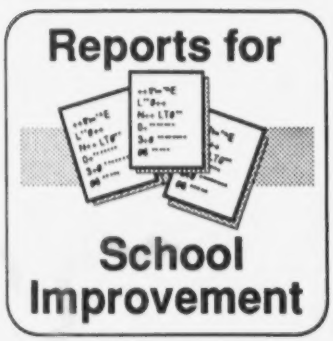

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Development of this manual has been funded by the Illinois State Board of Education Department of School Improvement Services ECIA, Chapter 2

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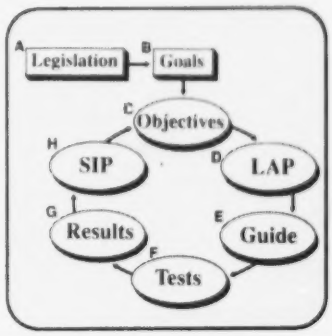
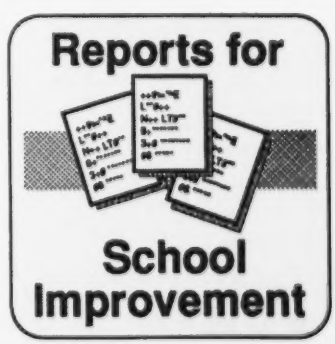
1 Introduction and Overview





A. How to Read This Report

This report is designed primarily to be a series of "How To" booklets.

1. How to operationalize a Learning Assessment Plan for a cooperative of school districts (Chapter 2);
2. How to and what to acquire as hardware and software (Chapter 3);
3. How to scan, score, and generate reports (Chapter 4);
4. How to interpret and utilize the assessment results (Chapter 5); and
5. How to do all of the above in an integrated manner with maximum efficiency, minimum headaches, and modest expenditures (all chapters).

Even the underlying purpose of the entire project can be expressed as "how to improve student learning." The use of clear learning objectives with Criterion Referenced Tests (CRTs) appears as one avenue to be pursued. The Bureau County Model Practices Project discussed in this report illustrates the feasibility of meeting the expectations and mandates of the public and their elected representatives. In terms of establishing feasibility, the project discussed herein is considered highly successful for the schools in the cooperative. Even more important, many of the methods and results probably can be utilized by the majority of school districts across Illinois. But most important is the inherent flexibility of the methods. That flexibility allows school districts to use any desired "how-to" segments without obligation to implement an entirely identical project.

The offered flexibility is ample evidence that the "how-to" content of this report is NOT intended to say "This is the only way." As a reader and potential user of this report, you are encouraged to pick and choose (and modify) whatever "how-to" chapters are appropriate to your needs.

The order of presentation of the chapters loosely coincides with the sequence of events in the school improvement cycle. Reading them in order seems logical and is recommended. On the other hand, reading or at least reviewing the final chapters first could help the reader understand the target toward which all of the efforts are being directed, namely the preparation of reports to guide the improvement of education in the school districts. Therefore, Chapter 5 is crucial and does contain information for all users of this report.

Some readers, such as assessment coordinators who have their assessment procedures and instruments virtually completed, probably will focus also on Chapters 3 and 4 about the use and power of the software and hardware. Others, including administrators in small or low-budget school districts, could find a valuable and viable model for cooperative efforts in Chapters 1 and 2. Anyone unfamiliar with the Illinois mandate for educational reform will find an overview in Chapter 1.

Wherever you place your emphasis, you are encouraged to at least browse the other chapters. The Bureau County Model Practices Project is an integrated effort. By understanding the entire project, you will be able to utilize better the particular aspects that fit your needs. Also, the cooperative project is continuing and growing in Bureau County, so the personnel there may be contacted for further comments based on their ongoing experiences and evolving methods and materials.

B. Legislative Initiative for School Improvement

The improvement of education is a major national concern that must be addressed at the state and local levels. Illinois is one of forty states with current legislated efforts utilizing various forms of Criterion Referenced Testing (CRT), Mastery Learning, or Minimum Competency Testing. In essence, the development of learning goals, objectives and assessments of student progress toward those goals began in Illinois as a result of legislation enacted in 1985.

The Illinois initiative is clearly stated in *State Goals for Learning and Sample Learning Objectives*, (page iii)

> The 1985 educational reform legislation addressed nearly every aspect of schooling and provided a unique opportunity for local school districts and the State Board of Education to work cooperatively to improve education in Illinois. One of the most important pieces of the legislation, one which has long-range implications for learning and teaching in Illinois schools, provides for the development of learning goals and assessment systems at both the state and local levels.
>
> Public Act 84-126, effective August 1, 1985, amended *The School Code of Illinois* to include, for the first time in the state's history, a definition of schooling and a requirement that the goals for learning be identified and assessed . . . . The legislation defines the primary purpose of schooling as the transmission of knowledge and culture through which children learn in areas necessary to their continuing development: language arts, mathematics, biological and physical sciences, social sciences, fine arts, and physical development and health.

According to the schedule for implementation, language arts was the first learning area to be addressed. The other areas are to be phased in over the next several years. The initial state-prepared assessment of reading under the new program took place in April of 1988. The state-wide assessments will be conducted each year in April. By May of 1989, every public school district in Illinois is expected to complete locally acceptable assessments of language arts in grades 3, 6, 8, and 11.

The Illinois State Board of Education (ISBE) was instructed to establish the goals for learning for each area. These have been published in six books entitled *State Goals for Learning*. For language arts, six goals are specified. Goal 1 is the following (and is used in the examples of this report):

As a result of their schooling, students will be able to read, comprehend, interpret, evaluate, and use written material.

Each goal is briefly discussed and has a set of statements of "General Knowledge/ Skills." Goal 1 has seven statements (A to G) of knowledge and skills, including:

> 1C. Reading for various purposes and indication of text to accomplish each purpose. (page 6)

The guidance from the ISBE goes one step further to provide "sample learning objectives" for each of the designated grade levels (3, 6, 8, and 11). Although these are merely suggested objectives, they are also a guide to what the State might use in its own state-wide Criterion Referenced Tests based upon the same main state goals. Fourteen (14) sample learning objectives for Goal 1 are given for the third grade. The one used as the example in this report is:

> "By the end of Grade 3, given the readers' prior knowledge and reading material with appropriate vocabulary demands, sentence

complexity, organizational plan, and concept load, students should be able to:

C2. Use appropriate texts such as fiction, nonfiction, poetry, letters, directions, and reference material to accomplish the various purposes for reading." (*State Goals*, p. 13)

In summary, the Illinois State Board of Education (ISBE) has provided extensive guidance concerning the general goals and specific objectives of learning. What it has NOT done is prescribe to the schools how the learning is to take place, nor even how such learning is to be assessed at the local level. Flexibility is abundant within the broad guidelines.

The ISBE has established a procedure whereby each district must specify its locally determined district-wide learning objectives and how they will be assessed. This is reported to the ISBE through a Learning Assessment Plan (LAP). After implementing what was specified in its LAP, each district must report the results in a School Improvement Plan (SIP).

The entire LAP/SIP process of "goal-directed" school improvement can be viewed as a constructive cycle. The basic idea is shown in Figure 1-1, but more interaction occurs between the components. Although generally applicable to other states, the examples that follow are specific for the Illinois Goal Assessment Program.

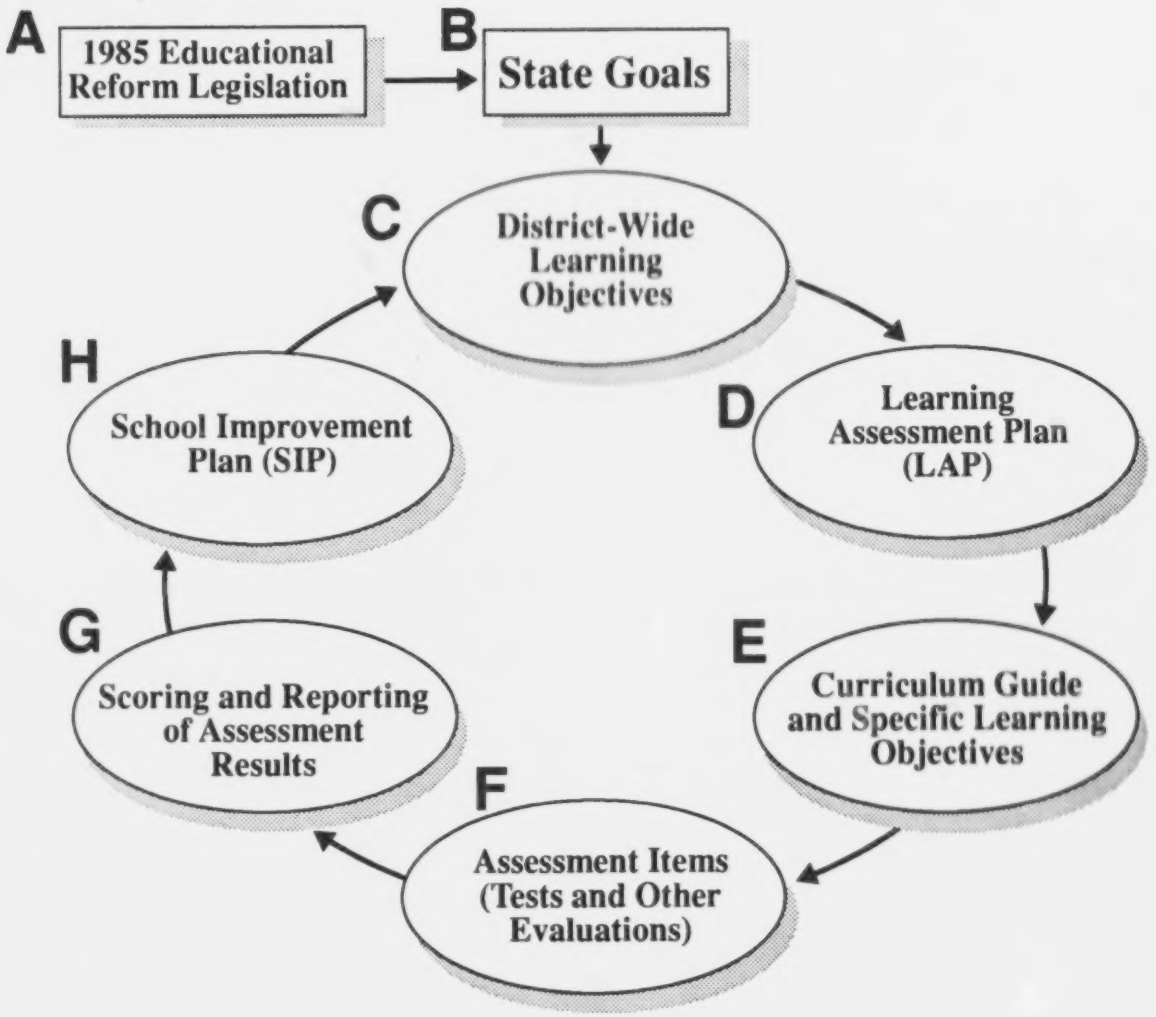


Figure 1-1: Cycle of School Improvement through Goal-Directed Education

A glance at the cycle shown in Figure 1-1 reveals three key facts.

1. Each school district must establish district-wide goals and a Learning Assessment Plan (LAP) that relates to the State Goals (Ovals C and D on Figure 1-1);

2. Through some combination of guided instruction (Oval E), assessment method (Oval F), and obtaining of results (Oval G), each school district is to operationalize what was specified in the LAP; and

3. The educational outcomes of the above efforts are to be incorporated into a School Improvement Plan (Oval H) that has impact for improving the District-Wide Learning Objectives (Oval C) and the Learning Assessment Plan (Oval D).

Thus the cycle starts over again in an upward spiral with improvements in objectives, methods, and, most important, student learning.

C. Background of the Bureau County Project and Cooperative

After the legislation was enacted, the Illinois State Board of Education (ISBE) funded twenty-six (26) "Model Practices Projects. . . to develop and disseminate effective practices in the Learning Assessment and School Improvement Plan process."

Many of the projects focused on specific tasks such as particular learning areas, statistical analyses, or assessment methods. A few projects were directed toward the full scope of the assessment procedures. The Bureau County Learning Assessment Cooperative (BCLAC) was funded for one of the broadest projects. The full title and short abstract are as follows (with emphasis added):

Title: A *Cooperative* Approach which Integrates the *Scoring* of *Assessment Instruments* Providing *Exemplary Reporting* Procedures and *Validity* and *Reliability* of *Locally Designed Testing Instruments*

Abstract: The project generates a generic set of materials for use by similar districts in their LAP/SIP process. Trained consultants deliver the process within the Learning Assessment Cooperative and beyond as requested. Phase I focuses on technology applications for the development and alignment of assessment instruments; phase II focuses on [scoring], reporting, materials development, and consultants.

To supplement the funding provided by the ISBE Department of School Improvement Services, the BCLAC pooled the diverse resources of the twenty-two school districts in Bureau County to establish a pilot project of "model practices" to assist other Illinois school districts in meeting legislative mandates of the Illinois General Assembly.

The twenty-two school districts in Bureau County range in size from 30 to 1,150 students. Of the twenty-two districts, eleven are elementary districts, five are high school districts, and six are K - 12 unit districts. One high school district has students from five separate elementary districts feeding into it, while another has three feeder elementary districts. The other three high school districts receive students from single elementary districts with the same approximate geographical area. The total number of students served by these twenty-two school districts is 6,600.

The county's population is primarily rural, with the largest community (Princeton) having a population of 7,300 and the majority of the other communities with populations of less than 1,500. Agricultural services and light industries provide most of the employment opportunities. Small retail businesses and professional services (medical, legal, accounting, banking) employ the remaining work force.

School districts in Bureau County have a long history of cooperative activities stimulated by the Bureau County Administrators Association. But no prior effort was as extensive as this project which evolved from Senate Bill 730. Even the largest school district in Bureau County perceived major difficulties in developing an assessment system that was prescribed by law.

At the recommendation of Larry Marsh, President of the Administrators Association, the districts shifted their focus and utilized the funds appropriated for staff development, learning objectives and Title II to develop a locally designed criterion referenced assessment system that would match the *State Goals for Learning and Sample Learning Objectives* published by ISBE. Marsh was appointed administrative agent and coordinator of the cooperative. Approximately 70% of the twenty-two school districts joined the Cooperative initially, with the remaining districts joining as deadlines drew nearer for the submission of Learning Assessment Plans and as they realized that generic standardized assessment instruments did not assess all the specified minimal objectives that had

been adopted. Furthermore, even the largest districts in the county came to the realization that cost factors prohibit development of an adequate learning assessment system alone.

In November of 1985, the administrators informally formed the Bureau County Learning Assessment Cooperative. Funding came from the Staff Development, Learning Objectives and Title 2 funds provided by Senate Bill 730 to each district.

The contributions to develop a locally designed system ranged from $150.00 to $600.00 for the smaller districts to $2600.00 to $4200.00 for the larger districts in the county. Cooperative efforts would have generated $30,000.00 had the Staff Development, Learner Objectives, and Title II appropriations been fully funded by the state government. However, reductions in appropriations reduced these combined totals for the Bureau County Cooperative to approximately $20,000.00 annually.

After receiving the "Model Practices" grant to develop the products discussed in this report, a steering committee was appointed to assist the coordinator. The steering committee functioned much the same as any executive committee in cooperative agreements. The steering committee was authorized to develop or purchase the necessary software and hardware for scoring and reporting.

An extremely important aspect of the project was the cooperation by the districts and their staff. As with most successful voluntary cooperative organizations, the willingness and ability of the leaders to lead must be matched by the encouragement and support of all others who participate and stand to benefit. Strong leadership and strong support contributed to the success of the Bureau County model practices project. Any attempts to replicate the organizational aspects of this project must pay attention to these issues. For further information, contact any member of the steering committee, as named at the end of this publication.

D. Objectives of the Project

The full project of the BCLAC has completed its initial phases. Those efforts focused upon the development of the cooperative's language arts Learning Assessment Plan (LAP), language arts curriculum guide, reading assessment instruments, and a system of machine-assisted scoring with exemplary reports. Significant progress has been made in the following seven major elements of the Bureau County Model Practices Project for school improvement:

1. Develop school district LEARNING ASSESSMENT PLANS (LAPs) in the learning area of language arts;

2. Develop, disseminate, and implement county-wide CURRICULUM GUIDES for language arts for grade levels 3, 6, and 8, consistent with the learning assessment plan;

3. Develop, pilot, evaluate, refine, and administer a local assessment system that includes both an ITEM TEST BANK organized by learner objectives and published ASSESSMENT BOOKLETS;

4. Develop or purchase COMPUTER SOFTWARE to serve as an appropriate "scoring template" including determination of INDICES OF VALIDITY, RELIABILITY, DIFFICULTY AND DISCRIMINATION in ways that can be replicated by other school districts;

5. RECOMMEND HARDWARE AND SOFTWARE MATERIALS to assist other school districts in the selection, cost analysis, and use of necessary materials to complete the assessments;

6. Generate reports for administrators, teachers and parents via EXEMPLARY REPORTING PROCEDURES for purposes of SCHOOL IMPROVEMENT based on the results of the developed local assessments, including assessment results for individual remediation purposes and item analysis;

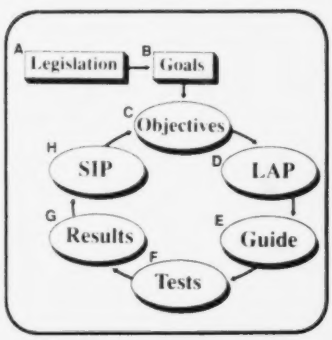
7. Identify and/or prepare CONSULTANTS AND WRITTEN MATERIALS to assist other districts in using the materials.

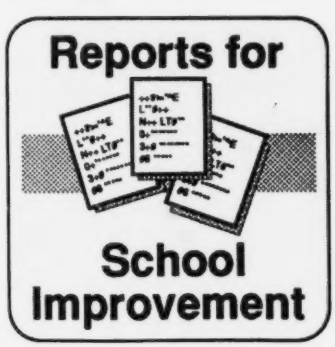
The first three elements above are objective-related tasks in the domain of the curriculum specialists. The Bureau County experiences with those tasks are presented in Chapter 2. The experiences serve as one example, not as a formula for all school districts.

Elements Nos. 4 and 5 above are covered in Chapter 3 about the computer software and hardware. The "how to run the software" discussion in Chapter 4 is part of the written materials mentioned in element 7. Element 6 for the exemplary reports plus the indices in element 4 are presented in detail in Chapter 5.

When taken together, the chapters of this publication provide an overview of how these seven elements were interwoven and accomplished in Bureau County prior to August 1988. This publication is intended not merely to report about the project, but also to serve as a pragmatic and flexible guide for other school districts that have agendas that contain similar elements.

2 Local Development of Objective-Directed Instruction and Assessment





A. Specific Learning Objectives and LAP

The preceding chapter shows how the momentum has already begun through the cycle of school improvement. Much guidance from the ISBE has been made available about the goals and learning objectives. At the local level, district-wide learning objectives have been formulated, most programatically expressed as the Learning Assessment Plan (LAP). Each district's LAP must include pages such as the one in Figure 2-1, but the contents may include whatever learning objectives the district chooses and can justify. Each LAP is essentially an outline stating the school district's intentions. Therefore, quality in the LAP will pay dividends at subsequent stages of the cycle.

As an example of "how to" complete the LAP, the Bureau County Learning Assessment Cooperative (BCLAC) employed consultants from Bradley University to

assist in developing the Learning Assessment Plans for the districts. Committees of teachers representing all the districts were organized to formulate the detailed plans to match or relate to the goals and objectives set forth by the ISBE's *State Goals for Learning.*

One committee was established to formulate the objectives for Reading and Language Arts. Those objectives (see Figure 2-2) were included on the Learning Assessment Plans (LAPs) that were submitted to the Illinois State Board of Education. LAP Committee members were appointed by the BCLAC coordinator with the assistance of the superintendents of individual school districts within Bureau County. One of the primary goals was to appoint committee members who could represent each grade level affected (3, 6, 8, and 11) and as many of the school districts as possible in Bureau County. Approximately fifty percent of the school districts had representatives assigned to the committee to develop the Learning Assessment Plans. The four or five members for each grade level are named in the Acknowledgements.

Instructions and codes for this form are provided on a separate sheet.

ILLINOIS STATE BOARD OF EDUCATION
Department of School Improvement Services
100 North First Street
Springfield, Illinois 62777

(Affix label or complete district information.)

SUBMISSION DATE: August 21, 1987

I. LEARNING AREA (Check one)

- [x] Language Arts
- [ ] Fine Arts
- [ ] Mathematics
- [ ] Social Sciences
- [ ] Sciences
- [ ] Physical Development/Health

LEARNING ASSESSMENT PLAN

ERIC/CLEAR | DISTRICT | CSL

DISTRICT NAME

CITY

II. STATE GOAL FOR LEARNING

1. As a result of their schooling, students will be able to read, comprehend, interpret, evaluate, and use written material.

Contact Person

Title

Phone ( )

III. LEARNING OBJECTIVES	IV. ASSESSMENT				V. EXPECTATIONS
By the end of grade (circle one) 3 6 8 10 students should be able to	A Types	B Validity/ Reliability	C Commercial Test(s)	D Evidence of Reliability/Validity for Student	Percent of Students Expected to Achieve Objective
C. Reading for various purposes and identification of text to accomplish each purpose.					
1. Use appropriate texts such as fiction, nonfiction, poetry, letters, directions, and reference material to accomplish the various purposes for reading.	D	2,3	-	2	60%

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Figure 2-1: Sample page (reduced in size) from a Learning Assessment Plan

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Subgroup #	LAP #	Description
1	IA1	Locate information that is explicitly stated in the text.
2	IA2	Summarize the important ideas of the text and the important supporting details.
3	IB1	Ask questions and make predictions about a passage prior to reading.
4	IB2	Ask questions and make predictions about a passage while reading.
5	IB3	Ask questions after reading that take into account the entire text read.
6	IC1	Use appropriate texts such as fiction, nonfiction, poetry, letter, directions, and reference material to accomplish the various purposes for reading.
7	IC1	Understand the difficulties of the text, requirements of the task, and their own knowledge, abilities and motivation.
8	IE1	Make inferences about the text such as unknown vocabulary, casual relationships, author's purpose, characters' emotions and motives, mood and tone using information from the text and prior knowledge.
9	IF1	Use, synthesize and analyze information from a variety of sources to enhance understanding, to compare/contrast, to verify information, and to expand knowledge.
10	IG1	Explain and verify answers to questions about what has been read.

Figure 2-2: Assessment Subgroup Numbers and Learning Objectives Used by BCLAC in Spring 1988 for Third Grade Language Arts

B. Curriculum Guide

The sending of the Learning Assessment Plan to the ISBE signifies that the school boards, administrators, and leading teachers have established the directions and pathways to follow. Now the task is to accomplish the goals through the organized and coordinated efforts of dozens of teachers and hundreds or thousands of students. A Curriculum Guide becomes essential.

The Curriculum Guide serves two major functions: to communicate to the teachers precisely what the school district expects to be taught/learned in the classroom, and to suggest instructional sequences to achieve district goals by the end of each grade level, not just for grades 3, 6, 8, and 11. In essence, the Curriculum Guide provides assistance and clearly stated expectations for the teachers to use with their daily lesson plans.

In Bureau County, the two university consultants worked with eight teachers appointed to the Curriculum Guide Committee by the BCLAC coordinator in consultation with the superintendents of the cooperating districts. The Curriculum Guide Committee developed the K-8 curriculum guide and is still developing the 9-12 learning area guides for Language Arts. The guides are designed to match the objectives specified in the LAP as well as other grade levels not included in the LAP. This committee analyzed numerous sample guides from publishing companies, other districts, and other state departments of education. The guide was designed for vertical articulation through the grades and horizontal articulation across the learning areas. A full set of examples from the final Curriculum Guide is reprinted on the next seven pages. For the examples given, the selected learning objective is to "Use appropriate . . . reference material to accomplish the various purposes for reading." Specific "how to do it" comments are given in Section D of this chapter.

Bureau County Curriculum Guide

for Language Arts with Specific Examples from Grade 3, Based upon Initial Specification of K-8 Mastery Level Learner Objectives in Language Arts for Bureau County School Districts

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Copies of other pages may be obtained from BCLAC

Preface and State Goals

In 1987, the 22 Bureau County school districts established the Bureau County Learner Assessment Cooperative (BCLAC) for the purpose of improving and coordinating educational programming throughout the county. In compliance with the 1985 Educational Reform Legislation, Public Act 84-126, the BCLAC Language Arts Curriculum Advisory Committee established language arts goals that are consistent the primary purpose of schooling. The State Board of Education defines the primary purpose of schooling as "the transmission of knowledge and culture through which children learn in areas necessary to their continuing development."

In order to meet the state mandates, the BCLAC membership reviewed and revised previously adopted mastery level language arts objectives for grades K-12. Representatives from the 22 participating school districts finalized this review. The ISBE State Goals for Language Arts Grades 3, 6, 8, and 11 were reviewed. The General Knowledge/ Skills for each grade were reviewed for inclusion. Curriculum recommendations for grades 9-12 are included in a separate document.

The following State Goals for Learning in Language Arts are essential for student success in virtually all areas of curriculum. The State Board concluded that language arts develops clear expression and critical thinking through the study of literature and the development of skills in reading, writing, speaking, and listening.

As a result of their schooling, students will be able to:

- read, comprehend, interpret, evaluate, and use written material;
- listen critically and analytically;
- write standard English in a grammatical, well-organized, and coherent manner for a variety of purposes;
- use spoken language effectively in formal and informal situations to communicate ideas and information, and to ask and answer questions;
- understand the various forms of significant literature representative of different cultures, eras, and ideas;
- understand how and why language functions and evolves.

BCLAC LANGUAGE ARTS
CURRICULUM ADVISORY COMMITTEE

AUGUST 1988

GENERAL INFORMATION
(for K-8 Language Arts Curriculum Guide)

Grade Level Color-Code

KINDERGARTEN - Goldenrod
FIRST - Salmon
SECOND - Yellow
THIRD - Green
FOURTH - Red
FIFTH - Pink
SIXTH - Lavender
SEVENTH - Blue
EIGHTH - Buff

Glossary of Terms

appropriate complexity - Each item on the matrix has been selected according to its appropriate level of complexity; - that students are able to accomplish the designated skill which is acceptable at that level of development.

alliteration - The use of the same sound at the beginning of stressed words in a group or line of verse, as the *f*'s in the phrase "a fair field full of folk."

analogy - A likeness that exists between two objects that are in other respects not the same: There is an analogy between the wings of a bird and the wings of an insect.

base word (root word) - In grammar, a word to which affixes and inflectional endings may be added.

blend - A blend is two consonant letters blending together, each retaining its own sound.

declarative sentence - Making a statement "I'll be home at five o'clock." is a declarative sentence.

demonstrative pronoun - Serving to point out a person or thing. In the sentence, "This is my book", *this* is a demonstrative pronoun.

digraph (vowel) - A combination of two vowels having one sound, as *oa* in boat.

essay - A short composition in which the writer gives his or her own ideas on a single subject.

familial - Of, characteristic of, or having to do with a family.

grapheme - The set of units of a writing system (as letters and letter combinations) that represent a phoneme.

homophone (homonym) - Any of two or more words that are pronounced alike but have different meanings, origins, and usually spellings, as son and sun.

hyperbole - An obviously exaggerated statement made for dramatic effect, as in "The coach is as tough as nails."

idiom - An expression having a special meaning different from the usual meaning of the words. "To put up with" is an idiom meaning "to tolerate or endure."

imperative sentence - Having to do with, or being the mood or a verb that expresses a command, request, or plea, (e.g., Go at once!)

indefinite pronoun - A pronoun, as one, any, or few, that does not identify or limit the person, persons, thing, or things to which it refers.

interrogative sentence - A sentence that asks a question.

metaphor - A figure of speech which suggests, without saying so, that one thing is like another. It applies a word or a phrase to something to which it does not ordinarily apply, as in "The room was a beehive of activity."

N.A. - Information that is not applicable at this grade level.

personification - A figure of speech in which inanimate objects or qualities are spoken of as having human characteristics, as in the saying "Necessity is the mother of invention."

phoneme - One of a set of the smallest units of sound serving to distinguish one word from another. The words *pin* and *tin* are distinguished by the phonemes *p* and *t*.

phonogram - A sign or symbol representing a word, syllable, or sound.

proper adjective - An adjective formed from a proper noun, (e.g. *Swiss* as in Swiss cheese).

root word - see base word.

simile - A figure of speech in which one thing is compared to another that is different in many ways, by the use of *as* or *like*, (e.g., The professor is as wise as an owl.)

theme - A subject or topic of discussion; a short essay.

MASTERY LEVEL OBJECTIVES BY GRADE LEVEL

GR.	Read-iness (K-3)	Phon. (K-8)	Comp. (K-8)	Voc. (K-8)	Rdg. Var.Pur. (3-8)	Stdy. Skls. (K-8)	List. (K-8)	Spkg. (K-8)	Wrth. (K-8)	Lit. Appr. (K-8)	TOTAL
K	9	0	3	0	-	0	0	0	0	2	(14)
1.	3	3	1	0	-	1	5	1	6	3	(23)
2.	1	4	0	2	-	0	1	2	3	5	(18)
3.	1	9	2	2	0	2	0	2	9	1	(28)
4.	-	6	2	1	0	1	0	0	4	2	(16)
5.	-	0	3	2	0	0	2	1	8	5	(21)
6.	-	0	6	3	0	2	0	0	18	1	(30)
7.	-	0	3	0	0	3	3	0	16	2	(27)
8.	-	0	5	1	1	1	0	0	14	0	(22)
TOTAL	14	22	25	11	1	10	11	6	78	21	(199)

EXPLANATION OF GRADE LEVEL OBJECTIVES

For the teacher's convenience, the objectives for each grade level have been cross-referenced with the Language Arts Curriculum Content Objectives found in the matrix. The numbers and letters found in each section for this grade level are the same numbers and letters that appear in each section of the matrix. For example, at each grade level

II. Phonics
  B. Vowels
    3. Identify and articulate long vowel sounds
      b. vowel combinations

will be the same as II.B.3.b. of the matrix:

The following terms and letters are used to indicate level of mastery of the objectives at each grade level in the same manner that they are used in the matrix.

I - *Introduce* - is defined as formal presentation of material for the first time;

D - *Develop/Maintain*- is defined as expanding upon previously introduced material as a sequential step to mastery of the area;

R - *Review* - is defined as restating material which has been mastered previously for the purpose of reinforcement of the material.

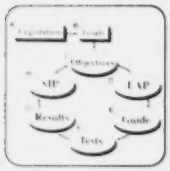
Goal & K/S - is a list of ISBE Language Arts Goals and Knowledge/Skills that correlate with the respective BCLAC instructional objectives.

BCLAC
MASTERY LEVEL LANGUAGE ARTS OBJECTIVES
GRADE 3

	Introduce	Develop/Maintain	Master	Review
VI. Study Skills				
1. Use basic location aides				
a. abc order			x	
b. table of contents			x	
c. textbook indexes	x			
2. Locate and interpret graphic aides		x		
3. Locate and interpret information in reference sources				
a. dictionary/glossary		x		
b. encyclopedia	x			
c. thesaurus	x			
4. Identify and locate parts of a book		x		
5. Distinguish between types of books (fiction, nonfiction, references, poetry)		x		
6. Use sources of information (e.g., schedules, newspapers, telephone book)		x		
7. Use library skills (e.g., card catalog, Dewey Decimal System, computerized on-line catalog)	x			
8. Use basic survival skills (e.g., fill out forms, take messages)	x			
9. Use research skills(e.g., notetaking, outlining, summarizing, synthesizing)	x			

* Objectives not covered in the adopted reading/grammar series.

C. Assessment Items



Members of the LAP and Curriculum Guide Committees served on the committee that developed the assessment instruments. This committee analyzed standardized tests, textbook tests, and teacher-made instruments. Five to ten items were developed to match each objective that had been filed on the LAP. These items were matched to each of the subgroups identified for each grade level.

All committees met monthly for a minimum of nine day-long meetings during the school year. Expenditures for travel and catered meals were charged to the cooperative's budget. The districts which had teachers serving on committees were reimbursed for the hired substitutes. Those districts incurred additional expenditures of at least $360.00 per teacher.

Upon completion of a sufficient bank of assessment items, pilot testing of students in grades 3, 6, and 8 was done at selected districts throughout Bureau County during the early part of the second semester of the 1987-88 school year. Pilot assessment of writing skills was also done for grades 3, 6, 8 and 11, utilizing the assessment guidelines established in the Illinois Writing Plan.

Important note:
Manual scoring and close observation of students are often appropriate during pilot testing. However, the advantages offered by machine-assisted scoring should not be overlooked. For example, the reports and statistics described in Chapter 5 can be of great value for evaluating the quality of the pilot questions separately and how they relate together to each learning objective.

The results of the pilot assessments were utilized to determine content validity. A committee of teachers was selected from the partici-

pating districts to serve as content specialists for selected grade levels. The committee, in conjunction with the curriculum consultants from Bradley University, also contributed to the Learning Assessment Plans and Curriculum Guide. An "Examiner's Manual" was prepared to enhance the uniformity of administration of the assessment instruments. It serves as a "how to do it" guide and is reprinted in its entirety. With appropriate local modifications, any school district is welcome to use it.

After reviewing the piloted items for validity and reliability (as discussed in Chapter 5), items were selected for inclusion in the final form of the assessment instruments based on acceptable difficulty levels. A criterion level (minimum percentage of answers to be correct) of sixty percent (60%) was agreed to by the participating districts as a county-wide minimum. Also, an expectation level (minimum percentage of students expected to attain the criterion level) was set at sixty percent (60%). Each school district in the cooperative has the right to set higher criterion levels and expectation levels in all or selected learning objectives. The criterion and expectation levels are set at the beginning of the cycle when the Learning Assessment Plans (LAPs) are submitted to the State Board of Education. An important part of the analysis of results for school improvement should relate to these minimum targets.

The process involving objectives, questions, pilot, and analysis culminates in the preparation of final assessment instruments that have continuity with the planned curriculum, providing an assessment system valid for its intended purpose. Examples of test items from the bank as they appeared on the finished third grade assessment instrument are shown after the Examiner's Manual.

Bureau County Learner Assessment Cooperative
Reading Criterion-Referenced Test
Examiner's Manual

PURPOSE

The Bureau County Learner Assessment Cooperative (BCLAC) basic skills reading test has been developed to survey students' academic achievement for Grades 3, 6, and 8. The test was designed to correlate with the goals and objectives included in the Bureau County Learning Assessment Plans as mandated by the State of Illinois. The test results will provide information to assist the school district in

....planning and evaluating programs
....assessing students mastery of state objectives
....identifying needs of individual students
....comparing individual and group growth annually

GENERAL INFORMATION

This test was developed by a committee of reading teachers and piloted by a random sampling of students in Bureau County. The test was designed to be administered in the spring.

MATERIALS

All students will need the following materials:

....a test booklet
....answer sheet
....2 sharpened #2 pencils
....eraser
....place markers (optional)

PLANNING FOR THE TEST

The test should not be administered immediately before or after a vacation break or holiday. Two or three days before the test, you should discuss with the students plans for administering the test. Also, a letter should be sent home to parents, informing them of the testing schedule and soliciting their support for maximum student performance (i.e., suggest that students get an adequate number of hours of sleep the night before the test and a good breakfast the morning of the test). Examiners should become acquainted with the testing material before the test is given. It is important for examiners to be careful to not provide clues to correct answers.

TIMING

These tests are not timed. Once the actual testing begins, it is suggested that students should be allowed to work for an approximate time period of one hour. The students should be given a break period and then continue to work until the test is completed. The estimated time to complete the testing session, including distribution and collection of materials, examiner's instructions, and a fifteen minute break, is approximately two to three hours.

SPECIAL CONSIDERATION

Students who have been identified and receive Special Education services may take the tests with their appropriate grade placement. At the discretion of the local district, special education students may be excluded from the district results. Upon completion of the tests, the answer sheets of those students that will not be included in the district results should be removed from the class set and scored separately.

GENERAL INSTRUCTIONS

1. Students will not write in the test booklets. No marks should be made on the answer sheet, except the answer responses.

2. Identifying information should be completed on the answer sheet, including name, grade, I.D. number and special code for Special Education. (Please see the attached sample answer sheet.) This information will be completed by the teacher for grade 3.

3. Call students' attention to the fact that answer spaces are given for A, B, C, D, and E (but D and E will not always be used).

4. Directions to be read aloud to students will appear in boldface print and in a box in the Examiner's Manual.

COMPLETING THE NAME AND I.D. GRIDS

Have the students fill in the Name and I.D. grids on the answer sheet, unless it has been done in advance for them. Use the following codes for completing the I.D. grid. Code only the student and I.D. grids.

1. Use columns A, B, and C for the school district code:

School	ABC
Cherry Grade School Dist. #92	092
Dalzell Grade School Dist. #98	098
DePue Unit School Dist. #103	103
Hall High School Dist. #502	502
Kasbeer Grade School Dist. #23	023
Ladd Grade School Dist. #94	094
LaMoille Comm. Unit Dist. #303	303
Leepertown Grade School Dist. #175	175
Malden Grade School Dist. #84	084
Manlius Comm. Unit Dist. #305	305
Neponset Comm. Cons. Dist. #307	307
Ohio Grade School Dist. #17	017
Ohio High School Dist. #505	505
Princeton Elementary Dist. #115	115
Princeton High School Dist. #500	500
Spring Valley Elementary Dist. #99	099
Tiskilwa Comm. Unit Dist. #300	300
Walnut Grade School Dist. #285	285
Walnut High School Dist. #508	508
Western Comm. Unit School Dist. #306	306
Wyanet Grade School Dist. #126	126
Wyanet High School Dist. #510	510

2. Use column H for the teacher code. Each school district should designate this code. Begin with "1" for the first teacher in the given grade and proceed in ascending order until all teachers in the grade for the entire school district have received a unique code.

   For example, American Elementary District No. 123 has two buildings with third grade classes. There are two third grade teachers in one building and three third grade teachers in the other building. Therefore, the teachers would be designated codes 1 through 5.

3. Use columns I and J for the student code. Each student in a class should be designated a code. Begin with "0" and proceed in ascending order until all students in the class have received a unique code.

   Code "Special Education" students with the highest numbers used. Separate their answer sheets for scoring purposes from the rest of the class after the test has been completed.

For example, Mrs. Smith's third grade class has 25 students. Two of these students have been determined to be LD students and have IEP's. Begin with student one as "01" and proceed through "25." The special education students will be coded "24" and "25" respectively.

PLEASE SEE THE ATTACHED SAMPLE SHEET.

INTRODUCING THE TESTS

Read the follcwing aloud to the students:

Make no marks in your booklets. They must be used again by other students. Don't open your test booklet until I tell you. Be careful not to fold or wrinkle your answer sheet or bend the corners. Keep it as clean as you can.

If you want to change a mark, make a new mark and then erase your first mark completely.

Make sure your answer sheet is on side 1.

Hold up an answer sheet and demonstrate.

When students have finished, continue:

Are there any questions?

Today you will be taking a reading test that will tell how well you remember and understand what you have learned. These tests will not affect your grades, but will help identify your strengths and weaknesses. It is important that you do your best. Answer each question as well as you can. If you are not sure of the correct answer, pick the one you feel would be the best choice. A good guess is better than no answer at all, and you will not be penalized for incorrect answers.

Now look at the sample on Page 1 of the Test Booklet.

Give the students time to look at the test booklet to see the sample on page 1. Check to see that all students are on the appropriate page.

Read the following paragraph and the sample question. Choose the best answer. (respond aloud). **The correct answer is "C," so you would fill in the rectangle "C" on your answer sheet if this were an actual question.**

Mark only one answer for each question and double check to make sure that you have filled in the circle you meant to fill in.

You will begin to work when I say, "Begin," and continue to work until you come to the word "Stop."

Are there any question?

Note: 1. You may read aloud the directions located in the test booklet if you feel it is appropriate.

2. The test for grade 3 has the word "Stop" included at various places in the test. This will give slower students an opportunity to catch up. Use your discretion to decide when students should continue to the next section(s).

THIRD GRADE SAMPLE

There are about 2,500 kinds of snakes. Some are big enough to swallow a grown-up deer whole. Some snakes in Africa can kill a man in a minute! But most of the snakes we see are harmless.

Nearly all snakes are ready to take care of themselves when they are born. A baby rattlesnake two minutes old can coil and strike. And he is poisonous, too.

A snake never stops growing. This is why he has to change his skin often. He gets a brand new suit about every six weeks. Some snakes have lived as long as 23 years.

Every six weeks a snake:
A. turns inside out
B. strikes
C. loses his old skin
D. eats

SAMPLE - GRADES SIX AND EIGHT

You need energy for everything you do. It takes energy to smile, to frown, and even to yawn. You get the energy you need from the food you eat. A locomotive also needs energy to make it run. It gets this energy from oil or coal. Most of the energy used in the world starts from the sun.

1. Most of the world's energy starts from:
A. three different places
B. the moon
C. the sun
D. coal and oil

When the sample question has been completed, ask:

"Are there any question?"

DIRECTIONS FOR CONCLUSION OF TESTING

When the test has been completed, please complete the following items:

1. Immediately collect the student test booklets, answer sheets, pencils, and scratch paper.

2. If special education students have been tested, separate their answer sheets into a separate set for scoring purposes.

3. Discard the scratch paper.

4. Check the answer sheets for correct marking of the answers. Darken the students' answer choices and erase any stray marks, if needed.

5. Return all test booklets, answer sheets, and pencils to the designated persons.

BUREAU COUNTY

Criterion - Referenced Reading Test

GRADE 3

SAMPLE - GRADE THREE

There are about 2,500 kinds of snakes. Some are big enough to swallow a grown-up deer whole. Some snakes in Africa can kill a man in a minute! But most of the snakes we see are harmless.

Nearly all snakes are ready to take care of themselves when they are born. A baby rattlesnake two minutes old can coil and strike. And he is poisonous, too.

A snake never stops growing. This is why he has to change his skin often. He gets a brand new suit about every six weeks. Some snakes have lived as long as 23 years.

Every six weeks a snake:

A. turns inside out
B. strikes
C. loses his old skin
D. eats

BUREAU COUNTY
READING TEST - GRADE THREE

Questions 16-22 ask you to select the correct reference source that would help answer these questions.

16. Which of the following books would you use to write a report about Abraham Lincoln?
   A. A dictionary
   B. An atlas
   C. A biography
   D. A book of poetry

17. Which of the following books might be considered fiction?
   A. All About Whales
   B. The Life and Times of Daniel Boone
   C. You and Your Body
   D. The Velveteen Rabbit

18. Which of the following books would contain rhyming words?
   A. Mother Goose
   B. Tom Sawyer
   C. Charlottes's Web
   D. Christopher Columbus

19. Which of the following sources would you use to find a map of the United States?
   A. Dictionary
   B. Atlas
   C. Table of Contents
   D. Card Catalog

20. Which of the following sources would you use to find the meaning of a word?
   A. Dictionary
   B. Atlas
   C. Table of Contents
   D. Card Catalog

21. Which of the following sources would you use to find a book about stars and planets?
   A. Dictionary
   B. Atlas
   C. Table of Contents
   D. Card Catalog

22. Which of the following sources would you use to find the beginning page of a story?
   A. Dictionary
   B. Atlas
   C. Table of Contents
   D. Card Catalog

(GO ON TO THE NEXT PAGE)

BUREAU COUNTY
READING TEST - GRADE THREE

QUESTIONS 23-25 ASK ABOUT THE FOLLOWING TABLE OF CONTENTS.

TABLE OF CONTENTS

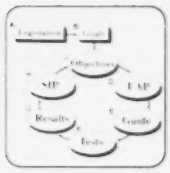
TITLE	AUTHOR	PAGE
Mary and Her Lamb	M. Goose	4
Bees Are Not Supposed to Fly	T. Morgan	11
The Lion and the Mouse	S. Brown	17
Billy and His Bike	P. Sandberg	23
The Rabbit and the Grasshopper	J. Thompson	32

23. Who wrote the story that begins on Page 11?
    A. M. Goose
    B. S. Brown
    C. J. Thompson
    D. T. Morgan

24. What is the title of the story written by P. Sandberg?
    A. "The Lion and the Mouse"
    B. "Billy and His Bike"
    C. "Mary and Her Lamb"
    D. "Bees Are Not Supposed to Fly"

25. The story "Mary and Her Lamb" begins on what page?
    A. 4
    B. 11
    C. 17
    D. 23

D. Notes on How to Prepare the Assessment Instruments and Costs



Although the previous pages of examples are valuable for showing "how to do it," they might give the wrong impression. The Bureau County Learning Assessment Cooperative did NOT set out to establish a model of content nor of presentation style. The content of any curriculum guide is highly individual for each school district or cooperative. Also, presentation style is only a reflection of the chosen page layout and a fancy word processor. But the BCLAC experience DOES OFFER several valuable "how to" insights to the process of implementing the LAP, especially in the context of small school districts.

1. Plan ahead!! As time runs out, the options diminish.

2. Any assessment instrument is specific to a set of learning objectives or segments of the subject matter. When the Bureau County Cooperative reviewed its objectives, the administrators and committees soon realized they were not satisfied with any previously existing assessment package. The questions and scope available did not match those desired by Bureau County. This is likely to occur for every school district unless the district adopts a pre-set package of learning objectives, curriculum guide, study materials, and assessment items.

3. The curriculum guides must be developed with great care. Inadequacies in the guidelines can lead to unfairness in the final assessment and ultimate failure or irrelevance of the entire goal-directed school improvement process.

4. The actual assessment instruments must be prepared to reflect the goals and objectives in the curriculum guide. Content of test booklets is far more important than pretty printing. Pilot studies, statistical analyses, content validity checks and other measures are needed for each variation of a test, whether it is to be used by 30 or 300 or 3,000 or 30,000 students.

5. Machine-assisted scoring and reporting are essential, even with small classes, in order to obtain the necessary statistical data to justify confidence in the assessment instrument and to provide needed reports for administrators, teachers, students and parents. (Further discussion is in the next chapters.)

6. Small school districts should not attempt such a project alone. Even medium-size districts are well advised to enter cooperative efforts. Cooperation is vital for attaining sufficient resources. The essential quality of content, style, dissemination, and coordination into the classrooms cannot be accomplished on a shoestring budget.

7. The time and resources (excluding hardware and software) needed to prepare a valid and reliable assessment instrument for one subject area is at least 12 months at a cost of $30,000 and 540 person-hours for teacher committees. This essentially equals one full-time person plus clerical and committee assistance.

Estimated costs for another school district or group to replicate the Bureau County materials for three grade levels for language arts (or for three grades in another learning area) are as follows:

Consultants (external) and coordinators (internal)	$19,000
Faculty time (includes substitutes at $40 per day)	5,000
Pilot	1,500
Printing	4,500
Total	**$30,000**

These estimates are for the first-time use with approximately 500 students tested in each of three grade levels. In this case, the cost was approximately $20 per student tested, excluding scoring and reporting. Each subsequent year for the same learning area is estimated to cost $4 to $6 per student tested. If the number of students served by the efforts of a cooperative (or large district) were double those of the Bureau County Project, the costs might drop to $12 to $15 per student for a first-time assessment, with $3 to $5 costs per student for subsequent years.

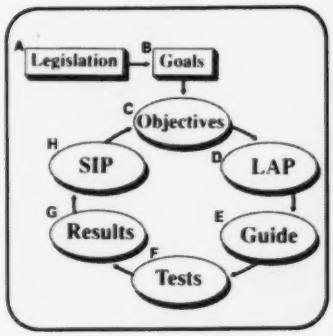
Although the gross numbers at first might appear high, the expenditures in dollars and hours can be considered very reasonable or even low-cost investments in light of the benefits to the students, teachers, districts, and state. The key to those benefits is the actual obtaining and use of meaningful results for school improvement. The following chapters focus on those results.

* * *

Although the preparation of an assessment instrument can be a distinctly individual effort of each school district or cooperative, certain procedures are more appropriate than others. In addition to the comments offered in this publication, at least two other references are highly appropriate for schools in Illinois. *Assessment Handbook* (1988) and the 1988 report by Springfield Public School District 186 are quite useful. By saying

similar things in different ways, these three totally independent publications sponsored by the Illinois State Board of Education are mutually supportive. Each report has different examples and emphases, but most of the methods can be freely intermixed to serve the needs of other districts. Even the computer-assisted test scoring systems used by Springfield and Bureau County have many similarities (and a few important differences), as discussed in Section 3.B.1. In general, in the realm of criterion referenced tests (CRTs) at least one methodology typified by the Bureau County and Springfield experiences does appear to be highly applicable to school improvement in Illinois.

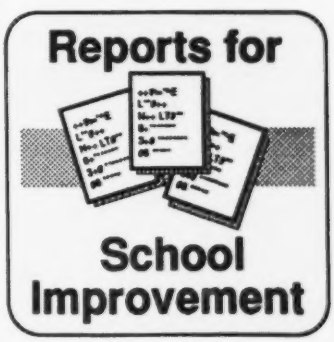
3 People, Software and Hardware



A • People First

Bureau County selected its machine-assisted scoring system the right way. People are first, software is second, and hardware is third. The first considerations should always be the needs and how the people can meet those needs.

Statistical analyses and numerous reports are clearly needed; manual processing is out of the question except for specialty items. The reports presented in Chapter 5 are a good indication of the variety of needs to be fulfilled. Item analysis, validity checks, subtotals for each learning objective and data-intensive analyses make evident the need for computer-assisted scoring to meet the Illinois school improvement mandate.



Furthermore, whatever solution would be eventually selected must be complete, efficient, fast, and user friendly.

Section 3.C and Chapter 4 give good examples of people-related features to be expected in hardware and software.

The solution to the needs also must be affordable. In the initial considerations by the BCLAC, "affordable" was defined in the budget as approximately $10,000 to serve the 22 school districts with nearly 7,000 students. In the final analysis, the BCLAC found that **much less money** could acquire the needed software and hardware, as is summarized in Section 3.D.

B. Software Second

1. The Selection Process

The second consideration is to select and obtain software that fulfills the needs of the people in the school district. There are literally dozens of test scoring software packages available, but only a handful can be considered to be of competitive commercial quality. System design, capabilities, special functions, versatility, speed, and ease of use are the distinguishing features of commercially viable software. Ironically, such features combine to make the software seem simple. Perhaps that is why so many people and organizations are tempted to write their own programs.

A good comparative illustration is the development of word processors that started as costly dedicated machines and software. With the advent of microcomputers, hundreds of word processor programs were written; some were and are still given away free. But fewer than ten full-featured, commercial-quality word processor programs now dominate the microcomputer scene. Today, nobody would write a new word processor program without major financial backing or some spectacular innovation to assure commercial viability.

The development of educational test scoring software has progressed along the same lines. Test scoring software has been until recently either an ultra expensive commercial package, an "in-house" project with high yearly maintenance costs or a "do-it-yourself" program with relatively few features, minor product support and minimal growth potential. Many of them have been written by professionals, that is, by people who earn their living writing software programs. However, most are not of commercial quality, based on volume sales, moderate pricing, voluminous features, clear documentation, telephone support, ease of use,

design for growth, speed, application to diverse situations, and fundamental product quality.

The selection process for Bureau County was correctly guided by the needs previously identified. For the Illinois situation the central concerns have been focused on Criterion Referenced Testing (CRT) to generate the analyses appropriate for guiding school improvement efforts. Other capabilities, such as item banking or graphics generation in test questions, are nice, but they are cosmetic features in the same category as word processing or contracting a print shop to make a test look more attractive. For Bureau County and for Illinois, the main issues are current processing power to generate reports plus a solid prospect for software growth for future needs.

The search for an appropriate test scoring and reporting package was conducted for two months by the technical staff at Educational Service Center No. 9. Numerous products were quickly eliminated, some because of high costs and substantial hardware requirements. Others were simply lacking in power. At least six products were reviewed in depth. At the end of February 1988, there were only three candidates.

1. A software program to be written "in house": One technical support person was available if this became the only option. However, this alternative appeared less attractive as more information was gained on costs not only to write the program but also to maintain it yearly. If written "in house," the program would have been similar to the second candidate, but for a faster microcomputer.

2. The Springfield CRT System: With a grant as an ISBE Model Practices Project plus substantial investment of school district funds, Springfield School District 186 wrote a test scoring software package based on several years of efforts. The high-quality pedagogical efforts by Springfield School District produced numerous reports to meet the State's mandates for

school improvement plans. As is clearly evident in the Springfield report, *Assessing Student Performance for School Improvement*, published in 1988 by the ISBE, that program was designed to meet the needs of Illinois school districts. However, the hardware and software used by Springfield were limited to one microcomputer that is not fast (Apple IIe), one scanner that has limited capabilities (ScanTron 1200), and one format of answer sheet (No. 2200). Nevertheless, with its exceptionally low price of less than $300, it was a software product worthy of consideration.

3. The MDT Education Test Scoring System: This third candidate ($1095 in November 1988) was still in its pre-release version when the technical personnel at ESC No. 9 reviewed the software. Although some loose ends were evident then, the BCLAC chose the MDT software for its ability to satisfy the school district needs. Based upon the favorable experiences during the Model Practices Project, the BCLAC considers the MDT software to be quite appropriate for its current and anticipated needs. There is only one supplier [MDT Corporation, 107 Broadway, Normal, IL 61761, Telephone (309) 452-6388].

2. The Selected Software

The MDT Educational Test Scoring System met nearly every requirement of the BCLAC. Furthermore, through a subcontract, additional features specifically desired for the Bureau County Model Practices Project were incorporated into the commercial package.

The MDT Educational System originated as a method of machine scoring of fill-in-the-blank questions. That method uses lists of alphabetized alternative responses sufficiently long to eliminate guessing. Several additional advantages are discussed in a book by Anderson (1987). The software also handles multiple choice responses and was primarily

designed for general classroom testing, such as for quizzes, mid-terms and final examinations. Neither fill-in-the-blank questions nor general classroom test scoring were of immediate interest to the Bureau County Model Practices Project, although both aspects could become useful as the school improvement efforts continue.

What Bureau County wanted (and did obtain along with the above-mentioned capabilities) was a powerful system to score, analyze and produce reports from the multiple choice Criterion Referenced Test (CRT) described in Chapter 2. Multi-Digit Technologies Corporation, with its core programs already written, began work on its CRT reports in early 1988. The initial work was influenced by the CRT model practices project of the Springfield Public School District 186. MDT Corporation openly discussed its interest in Criterion Referenced Testing with Dr. Robert Hill, Director of the Department of Instruction and the Coordinator of the Springfield Model Practices Project. Dr. Hill offered encouragement and explicitly stated that the Springfield effort could serve as a model for the various reports.

The core MDT software needed only three additional reports to equal the Springfield capabilities. Work on those reports had already begun when first contact was made with the Bureau County Learning Assessment Cooperative. Subsequently, additional features were specified by the Bureau County personnel. Without question, the adoption of the MDT software by the Bureau County Model Practices Project significantly helped the Cooperative meet and maintain the established timetable. Likewise, the adoption greatly accelerated the incorporation of the CRT capabilities into the MDT software.

Essentially, the BCLAC obtained the Illinois-related pedagogical quality (needs fulfillment) of the Springfield CRT methods, several additional features, and greater speed and versatility without the costs, time delays, and headaches of writing an "in-house" program. Furthermore, the previously-discussed qualities of a commercially viable product are built into the programs by James S. Schoner, a systems designer of

exceptional talents. The quality of the MDT software is indirectly evident in the reports generated (see Chapter 5) and in its user friendliness.

The MDT software is "menu driven," which means that the user selects the desired action from a menu-like listing (See Chapter 4). Any teacher or secretary who knows how to use a word processor is able to operate the MDT software. An assistant secretary in a Bureau County school district was assigned the responsibility to operate the hardware and software and to process 1,600 answer sheets from 50 classrooms in three grade levels. Her comments, printed below, are typical of what other users will experience:

> "The MDT Educational System leads you step-by-step through all operations performed. For those familiar with a computer, the only need for reading the manual is for quick reference, or to clarify an operation with which you are not familiar. There is no need to fear making mistakes and therefore "ruining your data." Backing out or re-performing an operation is virtually as effortless as the first attempt. MDT software is one of the most interactive softwares offered and sets the user at ease as it guides you through the menus with helpful comments and questions. MDT software generates various results and reports in a variety of formats all of which are easily comprehended. From my point of view as a user/operator, this software is highly recommended!"
>
> "MDT Educational System software gives new meaning to the phrase 'user friendly.'"
>
> Kay Luan P. Pierson
> August 17, 1988

More evidence of the ease of use is in Chapter 4 in which the actual operation of the software is presented.

In summary, the BCLAC is highly satisfied with the selected software for test scoring and reporting.

C. Hardware Third

1. Computers

After the needs are identified and the software is found to satisfy those needs, then the selection of hardware takes place. The first consideration is what computer best runs the selected software. As of the Fall of 1988, for reasons of speed, price, connectivity with scanners, processing of several reports and additional uses for the hardware, the preferred type of computer for the MDT software is the MS-DOS (IBM PC compatible) variety. Furthermore, program enhancements and major add-on features will appear first on the MS-DOS version of the MDT Educational Test Scoring System. If an MS-DOS microcomputer is already owned and available or if the school district is able to purchase one (minimum cost of $800), then the decision on what computer to use is essentially finalized. Use an MS-DOS (IBM PC compatible) microcomputer for your CRT testing with the MDT software.

School districts could be in one of four situations:

a. A district might own only Apple II computers and be unwilling to acquire an MS-DOS machine. Although an Apple II version of the core software is operational, it was designed primarily for typical classroom tests. The Apple version can currently (January 1989) use only one type of scanner and it does not have all of the features that are described in this report for Criterion Referenced Testing. CRT is much more demanding of processing speed and larger total class sizes. Development is continuing on an Apple IIGS version, but a delivery date has not been set. The software developer can provide further information and configuration specifications.

b. A district might own or lease extensive mainframe or minicomputer hardware. There is an available custom-made mainframe

version of the MDT software (in FORTRAN 77) with reduced features, but the MS-DOS scoring solution seems preferable. The MDT software permits data files in ASCII formats to be transferred for printing and database entries. Contact the software developer to discuss options.

c. If a district owns none of the above and cannot afford to acquire an MS-DOS microcomputer, consider the cooperative option as discussed in Section 3.D.2.

d. The best situation is to own or be willing to acquire (or share) an MS-DOS microcomputer.

MS-DOS (IBM PC compatible) microcomputers are manufactured by IBM, Tandy, Compaq, Dell, Cordata, Epson and dozens of other high quality suppliers of compatible PC, XT, AT, 386, and PS/2 models.

Any currently owned MS-DOS microcomputer may be used if it has the minimum configuration listed below. Many school districts already have such computers for accounting or word processing, but assessment coordinators are often unaware of their availability.

- MS-DOS (IBM PC) compatibility (DOS 3.0 or higher)
- 2 disk drives (one may be a hard disk)
- 1 serial port (for scanner)
- 1 parallel port (for printer)
- 512K RAM memory
- monochrome monitor
- keyboard

If purchase is necessary, a complete standard MS-DOS microcomputer with the above listed minimum configuration can be obtained either from a reputable mail-order vendor for about $800.00 or from local area vendors who offer diverse combinations plus home-town support. Consult a technical specialist or the software vendor. Package pricing could

be beneficial. If sufficient funds are available, the following additional features for the microcomputer should be considered. The list is in descending order of importance.

- Hard disk drive
- 640K RAM
- AT (80286 chip) motherboard
- Graphics card (if not already included)

Technical note: Limitations of disk space and available memory could impose restrictions on processing examinations when more than 500 students answer the same test. The software supplier can explain the options for handling larger numbers of students.

2. Printers:

The MDT software produces standard ASCII code that should print on any standard parallel printer that operates with the particular microcomputer. Costs range from under $200.00 to well over $1,000.00, depending mainly on speed and print quality.

3. Scanners:

The list of Optical Mark Readers (OMRs or scanners) compatible with the MDT software for MS-DOS microcomputers includes nearly every brand sold in the USA (in alphabetical order) :

SHEET READERS

- Cognitronics
- HEI
- NCS
- ScanTron
- Sekonic

CARD READERS

- Chatsworth
- CR-510
- HEI
- Michael & Assoc.
- PDI
- True Data

On the Apple II series microcomputers, the first scanner available is the CR-510 card reader.

Most manufacturers have several models; about twenty different options for scanners are available. The best advice is to determine the needs first and then evaluate the hardware options. Packages of software plus hardware are often available at reduced prices. The following notes provide suggestions. The software supplier can provide additional information.

Notes on scanners:

a. Fundamental differences between the various scanners may include:

- cost (price alone is an inadequate indicator of quality)
- speed (through-put of answer forms per minute)
- automatic vs manual feed (depends upon district needs)
- connectivity to microcomputers (must be RS-232 serial)
- darkest-mark-discrimination (for greater accuracy in distinguishing light marks and erasures) (available only on quality sheet readers with prices above $3,000)
- cost of answer forms (cards are less expensive but hold fewer responses than do sheets)
- capacity of various types of responses per answer form (sheets can accommodate more responses)
- warranty (to be expected as well as satisfaction guarantee)

- maintenance (options usually available, including replacement units during repairs)
- physical size (from small to gigantic)

b. The HEI Model 360 sheet reader with automatic feed (price $3750.00) is the current (January 1989) best purchase on sheet readers and was used by the Bureau County Project.

c. The CR-510 manual feed card reader (price $795.00 or less if packaged with the MDT software) was by far the least expensive yet reliable card reader.

d. Almost any currently owned Optical Mark Reader (scanner) that communicates via a serial port to a microcomputer can be used. [Zero additional purchase cost since it is already owned. Contact the software vendor for compatibility information.]

e. Card or sheet readers from NCS, ScanTron, HEI, Sekonic, Chatsworth, True-Data, PDI and Michael & Associates range in price from about $900.00 to well over $10,000.00, depending on capabilities. New models, features, and prices are occasionally released. [Contact the software vendor for compatibility information for specific models.]

f. In Section D of this chapter the above hardware information is summarized in ways to assist school districts in their purchasing decisions.

D. Cost Summary for Software, Hardware and Materials

1. Price Guidelines

The following list is a general guideline for what might be purchased in order to have basic equivalence with the Bureau County Model Practices Project as of January 1989. The total price would be substantially reduced if some components are already owned.

	Minimal Configuration	More than adequate Configuration
Scanner:		
CR-510 card reader	795	
HEI 360 sheet reader		3750
Microcomputer:		
Minimal MS-DOS unit	800	
With Hard Drive and 640K		1700
Printer:		
9 pin dot matrix 120 cps	200	
Faster and near letter quality		500
Hardware Subtotal:	$1795	$5950
Software		
MDT Educational System		
• Core plus CRT reports	$1095	$1095
• Grade Book (for student name file with card reader)	95	(not required with sheet reader)
TOTAL	$2985	$7045

All software and hardware products used by the Bureau County Model Practices Project are available for purchase from commercial sources. Educational discounts, volume discounts, and "package" discounts often apply. Optional assistance with installation, supervision, training, and customized enhancements usually can be arranged to suit specific circumstances.

Note: The ability to process large numbers of students means that the prices cited above represent a very low investment per student served. Options for cooperative efforts can provide substantial savings for small school districts. Furthermore, all of the components can be used for additional purposes throughout the year, thereby further enhancing their value to the school district.

2. Options for Cooperative Test Scoring and Reporting

Test scoring services have been available nationwide for many years. They tend to be expensive, focus on nationally administered norm-referenced tests and have slow turn-around time. Those services generally lack the flexibility to handle locally designed and administered tests.

The model of those test scoring services could be used by any group of school districts or cooperative entity with the necessary software and scanner. Some coordination and cost sharing would be necessary, but essentially the costs of hardware and software could be manageable for every school district, regardless of size.

Note: Remember that the scanner and software have usage year-round for regular test scoring, attendance, and numerous data entry tasks.

To implement cooperative test scoring and reporting, several considerations are necessary:

1. Reach agreement on the location, costs, hours of accessibility, and type of scanner, software and computer.

   Note: Multiple types of scanners and software could be offered at one location, but one is sufficient.

   Each user school district (or cooperative) needs at least one user/operator who is familiar with the software and system. Alternatively, the host district could charge for operator services.

2. The assessment coordinator of each district selects the appropriate answer form(s) that are suitable for the assessment and are compatible with the scanner and software. A variety of acceptable formats would be available at each scoring location.

3. The user school district should be allocated an appropriate time slot for scanning. Based on the Bureau County experience, scanning requires only two or three minutes per class of twenty-five students, using the described hardware and MDT software. Any user/operator who is familiar with the test scoring procedures discussed in Chapter 4 could scan the tests for five hundred students divided into twenty classrooms in one to two hours. Therefore, as little as one hour would be needed by a very small district, or an afternoon for a large (not huge) district.

   Note: This is for SCANNING ONLY. Scoring also takes very little time, but it can be done separately.

4. The joining together of classes to get building and district reports, plus the relative slowness of printers to make the reports, is a significant complication. If there is high demand for time with the scanner installation, a second or third copy of the software (but not the scanner) may be needed at the cooperative scoring location.

   Alternatively, the relatively low one-time cost for the software might permit user school districts to have their own licensed copies. The software used by the Bureau County Model Practices Project would support an arrangement where scoring and report generating were done miles away from the scanning process.

A cooperative effort for test scanning, scoring and reporting would be a logical development. Within Bureau County alone, the hardware and software expenditures were only a small fraction of what the twenty-two individual school districts would have invested for separate facilities. Those initially acquired items are now available for use in subsequent years. Software enhancements and additional hardware installations can be added gradually in Bureau County as the need for test scoring and reporting increases, as certainly will occur when CRT testing for other learning areas is established.

3. Recurring Expenses for Test Scoring and Reports

Apart from the internal expenses of electricity, space, and the user/operator, additional expenses associated with using the described configuration of software and hardware are mainly for paper goods. Numerous formats of answer forms (cards or sheets) acceptable for scoring are available. Two examples are shown on the next pages. They vary in cost because of size and quantity.

In general, cards cost $40.00 per thousand and sheets are $50.00 per thousand in small quantities. Volume purchases can lower the cost by

fifty percent (50%). Tractor-feed continuous form paper to print the reports is under $25.00 per box of 2500 sheets. One ribbon for a printer is about $6.00. Floppy diskettes cost less than fifty cents each.

In summary, the recurring expenses for answer forms, scoring and reports are approximately ten to twenty cents (10 - 20¢) per student. The labor cost for the user/operator would be an equal amount. Together the expenses for materials and labor are estimated to cost between twenty and forty dollars ($20 - $40) per one hundred students.

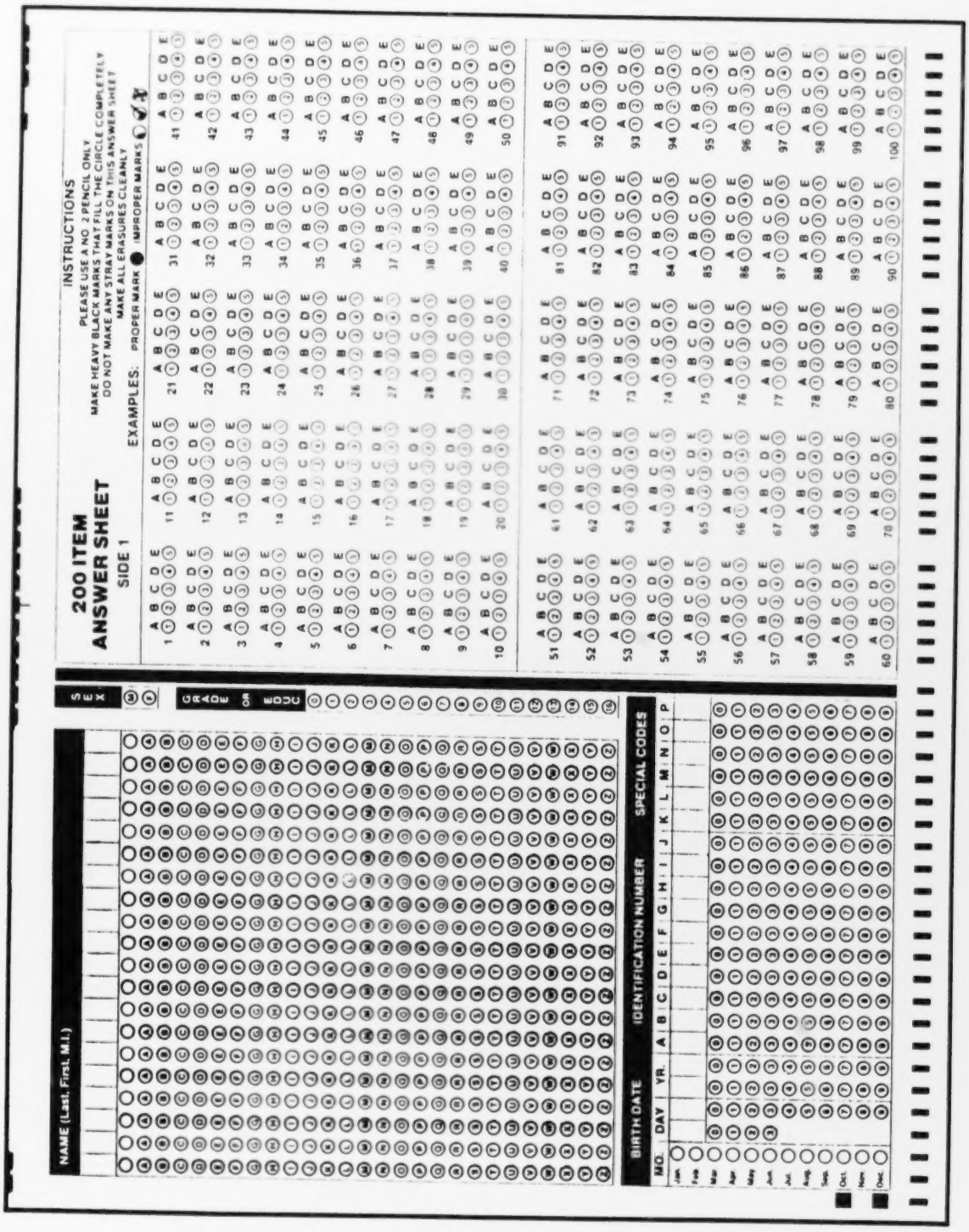


Figure 3-1: One Format of Answer Sheet (reduced in size)

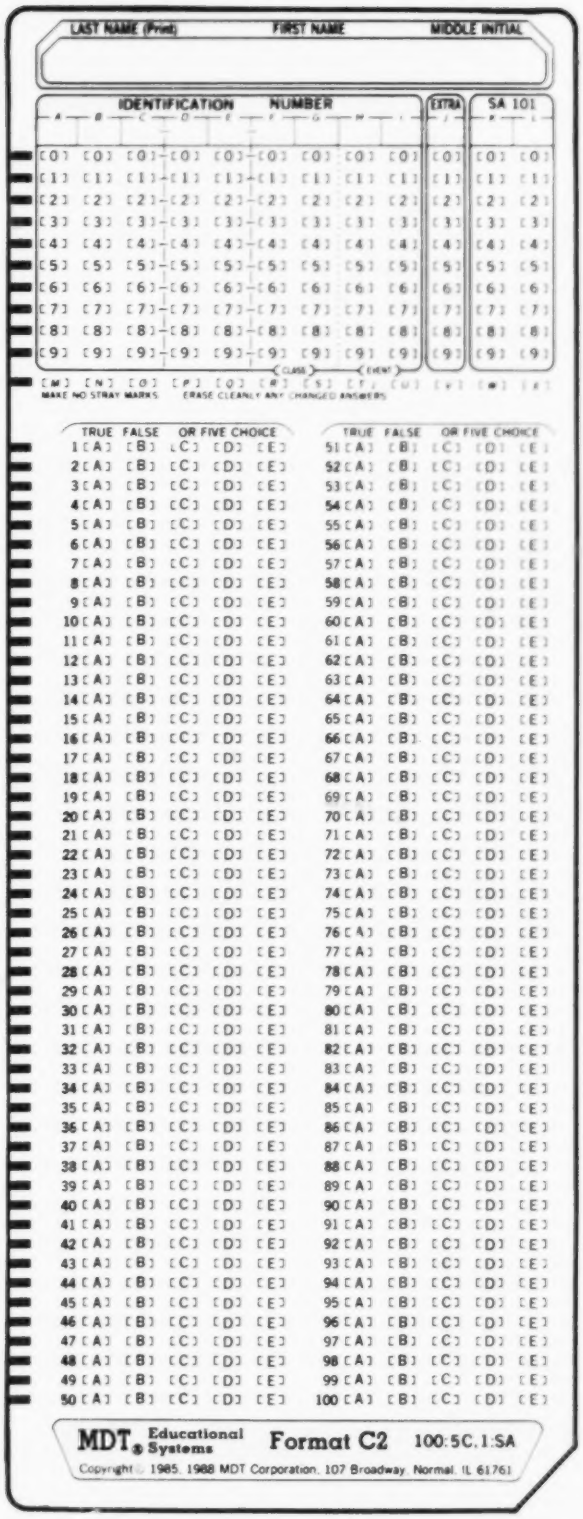
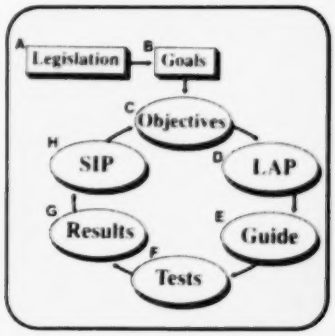


Figure 3-2: Example of One Answer Card
for 100 Multiple Choice Questions

4 Test Scoring from the Software User's Perspective



A • Getting Started

Teachers, assessment coordinators, and users/ operators view educational measurement software from a different angle than do computer coordinators and software writers. The following is a user's view of testing, with references to the components and procedures in the MDT Educational System. Important features and terminology are introduced in this overview. For complete definitions and detailed instructions, see the referenced sections in the *User's Guide* of the MDT System. All references here are for MS-DOS (IBM-compatible) microcomputers with two floppy disk drives. Users with a hard disk have slightly easier operations once the directories have been created by the computer coordinator or software installer.

1. First use of the computer

For this explanation of the MDT software we assume that the user (you) does know a little about the computer. Power on/off switches, disk handling, formatted disks, keyboard characteristics, menu usage, paper in the printer, etc., are not covered in this discussion. Let us also assume that the MDT program disks (the executable copies) have been prepared according to the installation instructions in Appendix A of the *User's Guide*. In other words, we are ready and able to load the MDT software into the computer and utilize the menu options.

2. The Data Disks

When using the MDT Educational System there must always be a program disk in Drive A and a data disk in Drive B (unless there is a hard drive). Each data disk starts out as a blank formatted disk. For the CRT testing, it is strongly suggested that there is only one grade level and learning area on each disk. Think of it as a paper file folder that will eventually contain tests, statistics, grade book, etc., for that specific assessment, such as 3rd Grade Reading in 1989. Would a teacher use a file folder of the 6th grade for the 3rd grade class? No. Likewise, the data disk for a specific assessment instrument must never be removed from Drive B unless the computer program is at its starting point, which is called the Main Menu. To remove the data disk at any other point is like placing pages into the wrong file folder or putting the folder into the wrong file cabinet drawer.

3. The MDT System and Environment

In order to make things efficient for the teacher, the MDT software does a lot of work behind the scenes. There really is a SYSTEM! The MDT Educational System includes an ENVIRONMENT that keeps track of all the information that is provided about each usage of a test. Details about the environment are written in the full *User's Guide*. Most users only need to know that the MDT Environment exists and that it is designed to help you in many unseen ways.

4. *Start Up the Program*

You first turn on the computer and load in any one of the MDT executable program disks. If the program does not "self-boot," type the three letters MDT at the system prompt, which is A> on the IBM MS-DOS computers. After each command, remember to press <Enter>, which is also known as "carriage return" or the "↵ " key. The first screen should look like Figure 4-1.

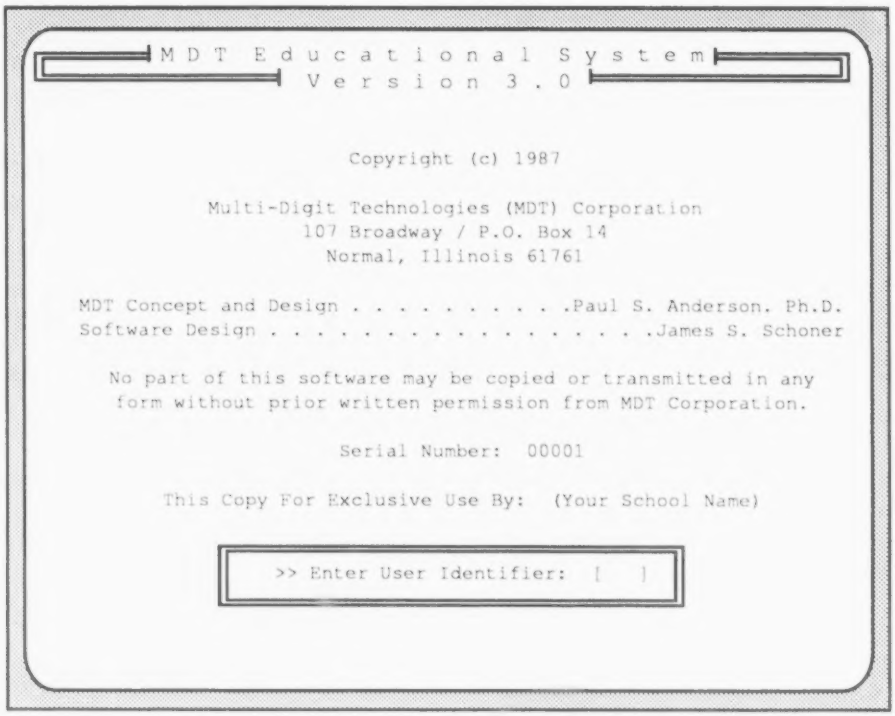

MDT Educational System
Version 3.0
Copyright (c) 1987
Multi-Digit Technologies (MDT) Corporation
107 Broadway / P.O. Box 14
Normal, Illinois 61761
MDT Concept and Design . . . . . .Paul S. Anderson. Ph.D.
Software Design . . . . . .James S. Schoner
No part of this software may be copied or transmitted in any
form without prior written permission from MDT Corporation.
Serial Number: 00001
This Copy For Exclusive Use By: (Your School Name)
>> Enter User Identifier: [ ]

Figure 4-1: User ID Screen

5. *User Identifier*

The first screen asks you to identify yourself with any three letters or numerals called a "User Identifier." We suggest that you use your initials unless some other user of the computer has exactly the same initials. Then press the <Enter> key. The program then advances to the Main

Menu, which is shown in Figure 4-2. Please note that in the "Controls" section of the Main Menu, the letter [c] indicates an option to change the User Identifier.

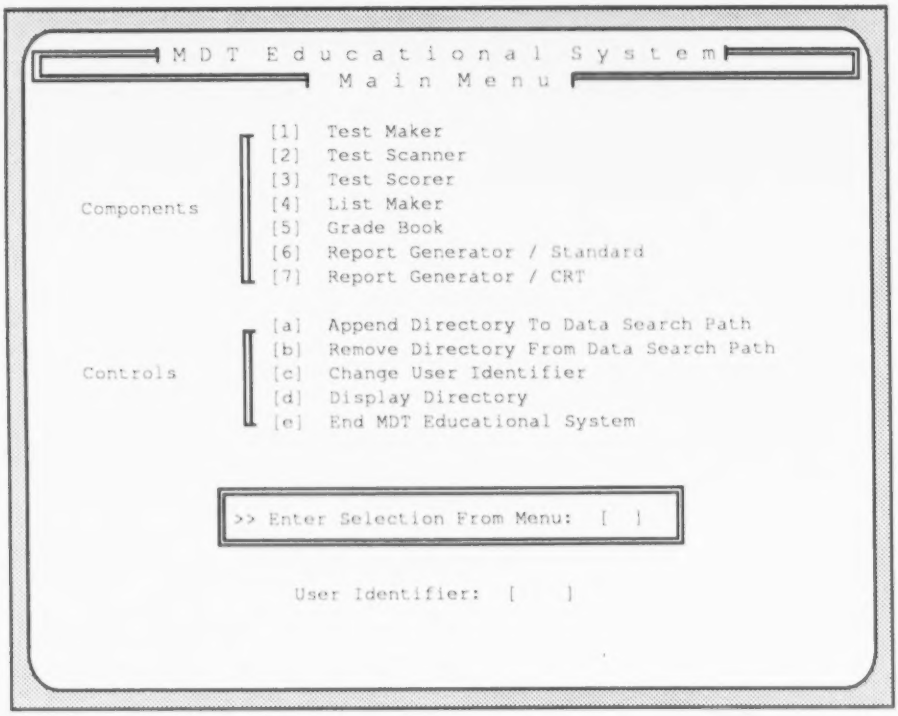


Figure 4-2: Main Menu of the MDT Software

6. *Main Menu*

The options offered on the Main Menu are basically self-explanatory. You make your selection by typing the number or letter and then <Enter>. You will note that the words "Not Resident" may appear to the right of some options. That message means that the MDT program disk currently in Drive A does not contain those programs. To access one of them, simply remove the program disk from Drive A and insert the desired program disk. Type the desired menu number, then <Enter>. The "Not Resident" message will blink off and the selected program will operate.

7. Backtracking and Escape

An important part of getting started is knowing how to stop or backtrack to a previous step. For MS-DOS compatibles, the ESCAPE <ESC> key will allow you to backtrack two different ways. When you have typed in information of more than one character, the <ESC> key will clear the characters entered. New information can be entered or the <ESC> key can be pressed again to return the user to the preceding step in the program. When the <ESC> key is used for selections that only require one character, you will be taken back to the preceding step in the program. If you repeatedly press the <ESC> key, the computer will eventually return to the DOS prompt.

8. The Test Event

When students are taught, teachers usually evaluate their learning. This educational measurement can be called a "test event." The instructor decides when and where it will take place. Each event is given a distinct identifier (name) with up to eight letters or numerals without spaces or special characters. An example would be L3R89SM, which could stand for Lincoln School, third grade Reading 1989 with teacher Smith. Once you have decided what to call the events, you will do the following steps with the Test Maker program to initiate ("create") a test event such as L3R89SM onto the data disk in Drive B. At the Main Menu, make selection [1] and press <Enter> to load and begin the Test Maker Program. The screen is shown in Figure 4-3. [Test Maker currently (January 1989) is only an "event maker" to which additional features will be added.]

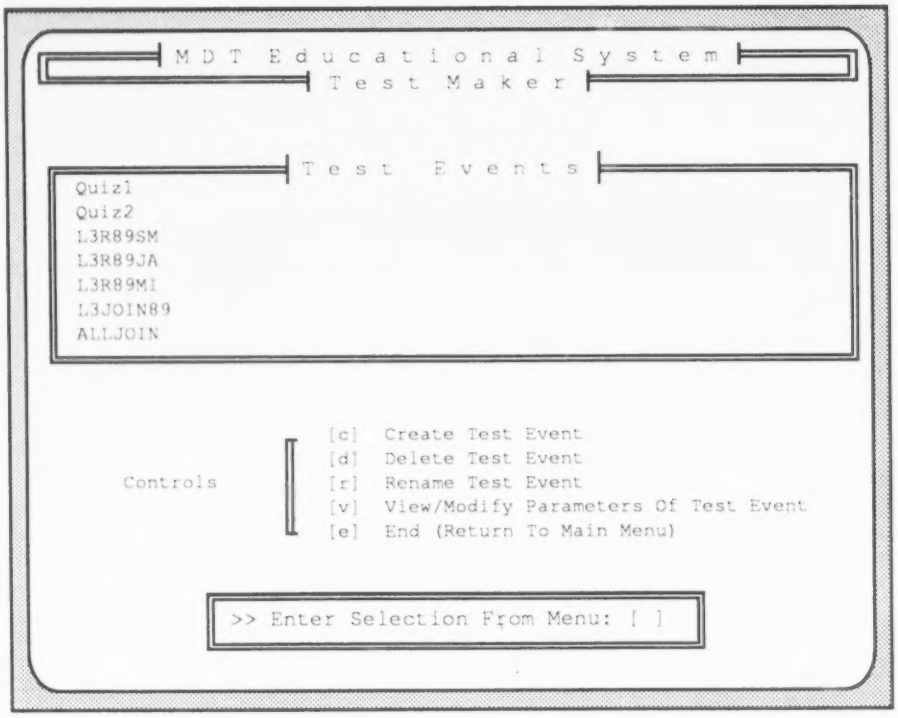


Figure 4-3: Test Maker Screen

The names (identifiers) of all the previously-created test events, as found on the data disk in Drive B, are displayed on the screen. When you are just beginning, that list is blank.

Select option [C] for "Create a Test Event" and press <Enter>. Then type in the event name, such as L3R89SM in our example, then press <Enter>. The screen shown in Figure 4-4 will appear.

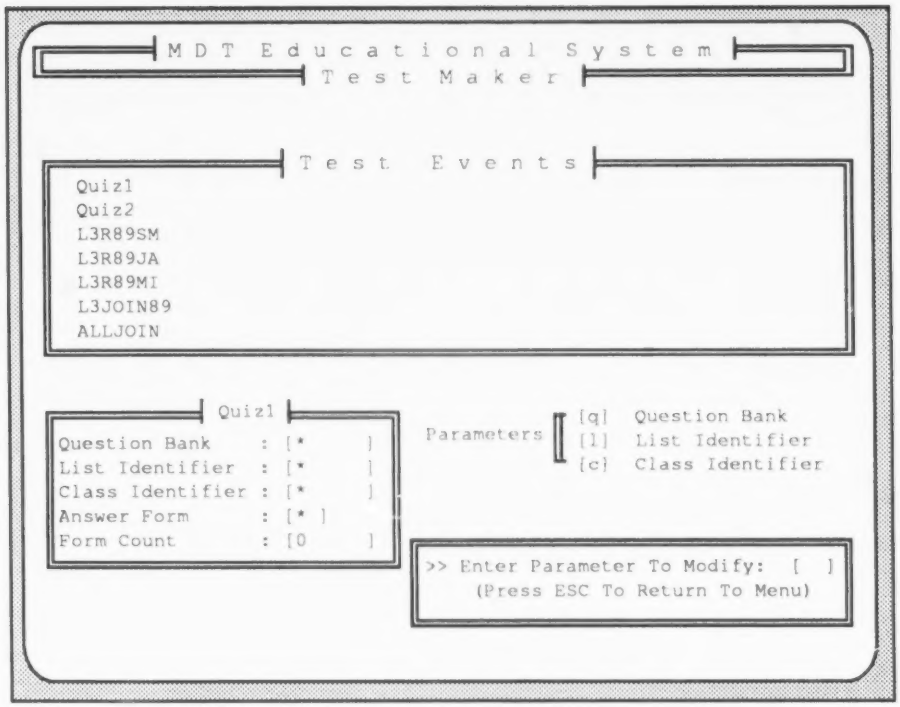


Figure 4-4: Screen to specify a list of class

You are allowed to specify an identifier for a Question Bank (to be available on a future enhancement), for an MDT list (when using the multi-digit format of testing), or for a class. The use of a class identifier will permit the software to obtain student names to match the student ID numbers on answer cards. Type [C] and press <Enter> for class. Then type the Class Identifier, such as 3LIN89 (3rd grade Lincoln School 1989) followed by <Enter> to record your information. Then simply press the <ESC> key to save the test event you just created.

At this time you can also (and should) create in the system the test events for each batch of student tests to be scored. Also create the events that will result from the joining together of different classes that will take the same test, such as L3JOIN89 in Figure 4-4. Rest assured that any of these entries can be changed, deleted, added or renamed later. However, it is useful to get them into the system early because it makes clear to the user/operator exactly what the assessment coordinator is

expecting. Chapter 5 is helpful for understanding the concept and importance of joined test events.

9. Answer Forms and Control Forms

Because your school probably has only one scanner (sheet or card reader) that will give data to the MDT Educational System, your hardware does limit the selection to a few styles of answer forms. Your assessment coordinator made the selection when the test was being prepared. You should be told the identifier (such as H1, H2, C2, or T1) and should have a few spare forms for accidents and for the control forms.

Every test event requires three (3) control forms. All three must be on the same format of answer form (sheets or cards) used by the students. It is normal that the assessment coordinator would prepare these three forms.

Control Form 1 is the Answer Key: Mark the correct responses. If a question does not have an answer marked on the key, that question will be skipped in all analyses.

Control Form 2 specifies the Points per Question: Each question can have its own point value. For multiple choice questions, the points can range from one to five (A=1, B=2, etc.). If a question is to have the same point value as the preceding one, the point value can be left blank.

Control Form 3 designates the Subgroup of Each Question: Each multiple choice question can be assigned into subgroups (learning objectives) one through five on the third control form. Later, when scoring takes place, any question can be placed into any subgroup from zero to twenty-five (0 to 25) by keyboard entry. (Subgroup zero is used as a null subgroup.) If a question is to be in the same subgroup as the preceding one, that subgroup designation can be left blank on the control form. If you decide not to use subgroups or do not know them at the time of scanning, it is imperative that a blank card or sheet be used as the third control form.

Note: The three control forms **must be scanned in order** and at the beginning of each batch of student answers, as described in the next section.

B. Processing the Completed Tests

The user/operator should receive a stack of marked answer forms for each class that took the test. On top of each stack the three control forms must be placed. We assume that the hardware items (computer, scanner, and printer) are connected, turned on, and operational. Please be familiar with any hardware-specific instructions, such as how to place the answer forms into the scanner, and which buttons (if any) need to be pushed.

1. Scanning

We assume that you have to do all the test processing yourself. Turn on the computer with the MDT program disk for "Test Scanner" in Drive A and your data diskette in Drive B. Use the same three initials as your user identifier that was used to create the test events (see step A.5 above). At the Main Menu (see Figure 4-2), enter the Test Scanner program by typing 2 and pressing <Enter>. That will present the screen in Figure 4-5 and the first query. When asked, specify the identifier of the answer form used, such as C2. Then type in the name you want for the test event, being sure that the name is also listed as a created test event in the box on the monitor screen. Press <Enter>. [If the event was not previously created, you need to go to the Test Maker program to create it.] When requested by the computer, insert your answer forms, being sure that the three control forms go through first and in the correct order. If any answer form does not match the designated format, a short "beep" will sound and instructions will appear on the screen. Press <ESC> when finished scanning. The MDT environment stores everything in the correct places and returns you to the Main Menu.

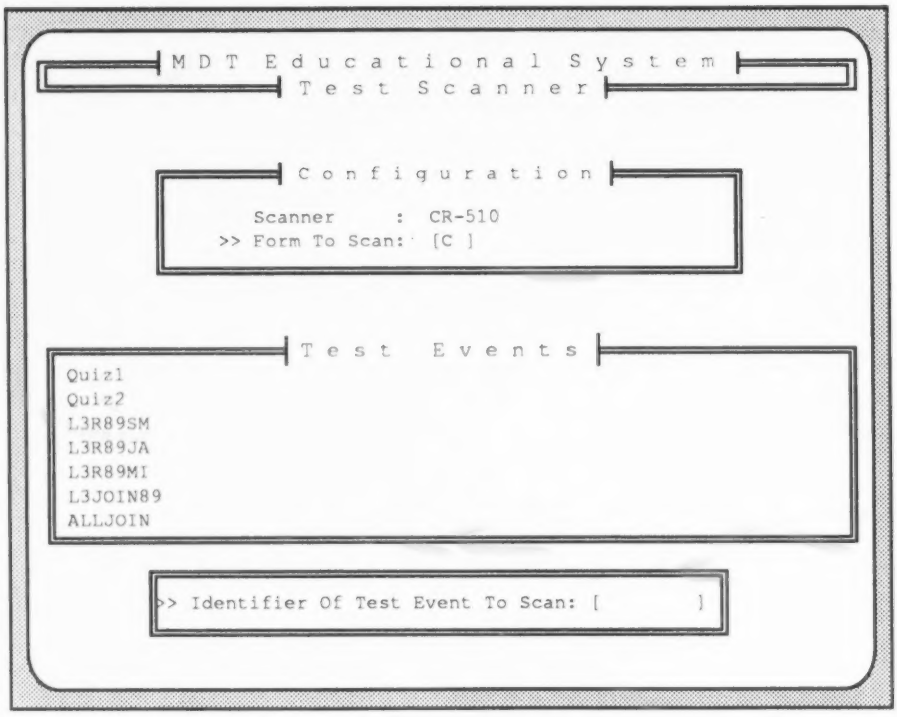


Figure 4-5 Screen for Test Scanner

2. *Scoring*

So simple. Select the Test Scorer component on the Main Menu. You will then see the menu shown in Figure 4-6. Select and enter the [S] option to score the test event. Then type in the name of the already scanned test event and press the <Enter> key. You will have an opportunity to change the subgroups specified for the questions, as shown in Figure 4-7.

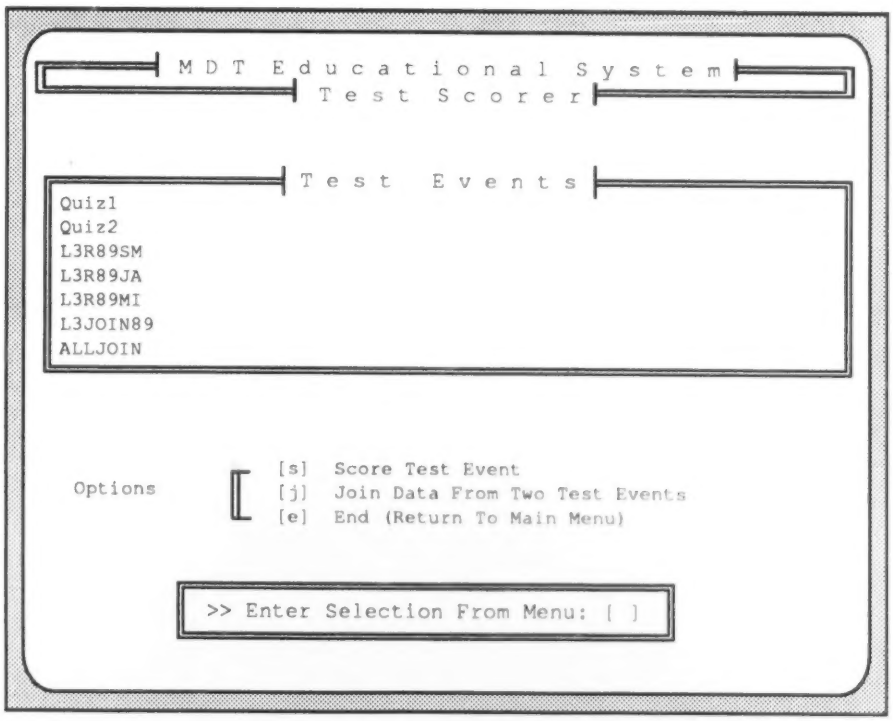


Figure 4-6: Screen for Test Scorer

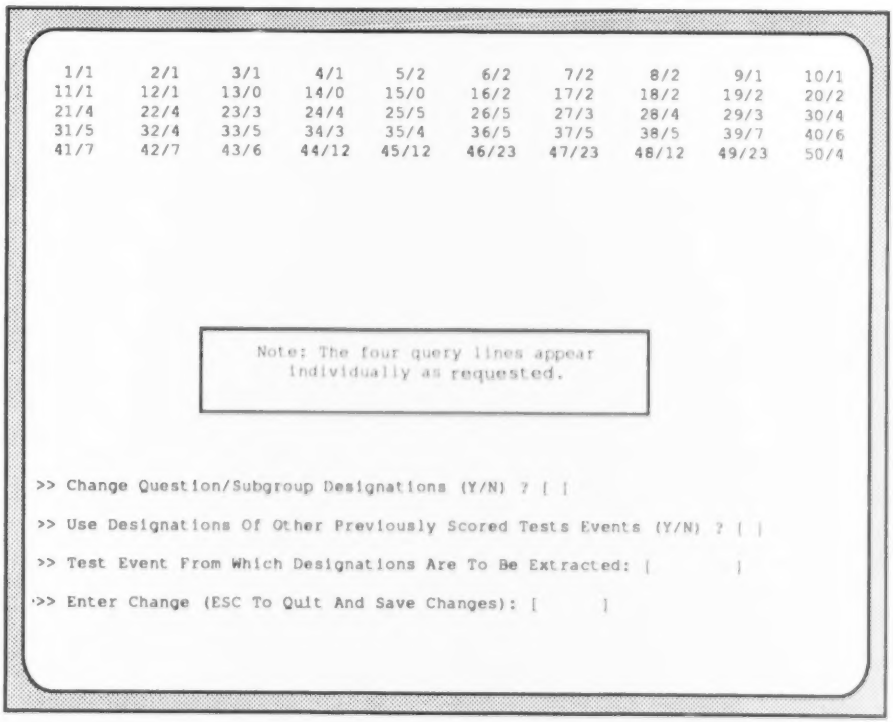

1/1 2/1 3/1 4/1 5/2 6/2 7/2 8/2 9/1 10/1
11/1 12/1 13/0 14/0 15/0 16/2 17/2 18/2 19/2 20/2
21/4 22/4 23/3 24/4 25/5 26/5 27/3 28/4 29/3 30/4
31/5 32/4 33/5 34/3 35/4 36/5 37/5 38/5 39/7 40/6
41/7 42/7 43/6 44/12 45/12 46/23 47/23 48/12 49/23 50/4
Note: The four query lines appear individually as requested.
>> Change Question/Subgroup Designations (Y/N) ? [ ]
>> Use Designations Of Other Previously Scored Tests Events (Y/N) ? [ ]
>> Test Event From Which Designations Are To Be Extracted: [ ]
>> Enter Change (ESC To Quit And Save Changes): [ ]

Figure 4-7: Screen to Accept or Change Subgroup Designations.
Maximum of 200 questions into 25 subgroups.

The system asks if you want to use subgroup designations from another previously scored test event. The first time you must say no (type N, then <Enter>). For subsequent test events, you can say yes and then identify the test event from which the subgroup designations are to be retrieved. When you type in the changes to the subgroup designations, the numbers 0 (zero) through 25 are valid. Subgroup 0 (zero) will eliminate any item (question) from the analyses. When the subgroup changes are complete, press <ESC> to initiate the scoring process. It is quite fast. If you don't watch closely, you may not realize that the scoring took place. After the scoring process is completed the program will return automatically to the Main Menu. You may score and rescore any event as many times as desired. This allows you to change the subgroup designations of any questions as needed, an extremely important feature for the assessment coordinator who is responsible for item validity and test reliability.

The Test Scorer component also permits the joining of two test events into another test event (that must have been created using the Test Maker program). The two events must be based on the same test, such as when several classes are given the same CRT test. Joining does NOT destroy the original scored events unless the same event identifier is used twice, that is, when it is being overwritten. Joining may be repeated until a [current] maximum of 500 students are in one test event. [To process larger numbers, contact the software supplier.]

3. Reports

Examples of the reports are found in Chapter 5. To generate reports, insert either of the two Report Generator disks and select the desired MDT Report Generator from the Main Menu, then press <Enter>. The first monitor screen for either Report Generator is a listing of test event identifiers. Where prompted, type the desired test event identifier and press <Enter>. For the CRT Reports, one screen (see Figure 4-8) handles the specification of the criterion levels for the subgroups or learning objectives.

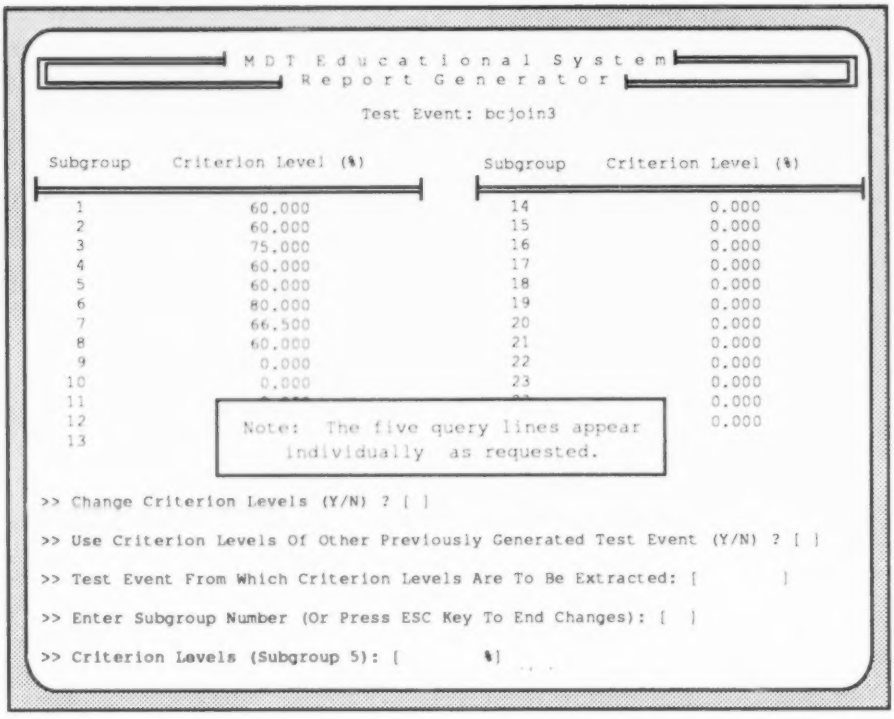

MDT Educational System
Report Generator
Test Event: bcjoin3
Subgroup Criterion Level (%) Subgroup Criterion Level (%)
1 60.000 14 0.000
2 60.000 15 0.000
3 75.000 16 0.000
4 60.000 17 0.000
5 60.000 18 0.000
6 80.000 19 0.000
7 66.500 20 0.000
8 60.000 21 0.000
9 0.000 22 0.000
10 0.000 23 0.000
11 0.000
12 0.000
13
Note: The five query lines appear individually as requested.
>> Change Criterion Levels (Y/N) ? [ ]
>> Use Criterion Levels Of Other Previously Generated Test Event (Y/N) ? [ ]
>> Test Event From Which Criterion Levels Are To Be Extracted: [ ]
>> Enter Subgroup Number (Or Press ESC Key To End Changes): [ ]
>> Criterion Levels (Subgroup 5): [%]

Figure 4-8: Screen to Specify Criterion Levels

The menu of selectable reports for Standard and CRT testing have similar appearances except for the options in the Report Menu area (see Figures 4-9 and 4-10). When those menus appear, type the desired identifying number [n] for a report and press <Enter>. The selection will be highlighted and marked with an asterisk "*" on the screen.

Repeat the selection step (above) for as many reports as desired. To cancel a selection (to "un-select"), type and enter the identifying number a second time. All selections can be changed as many times as desired prior to the request to generate reports discussed below. All reports are generated in the order in which they appear in the menu, not in the order of selection.

Note that the first two standard reports and the first CRT report are printed individually for each student. They are intended to be given to each student as personalized feedback. You are asked (query on bottom

of the screen) if reports are wanted for all students or just for individuals to be selected by Identification number.

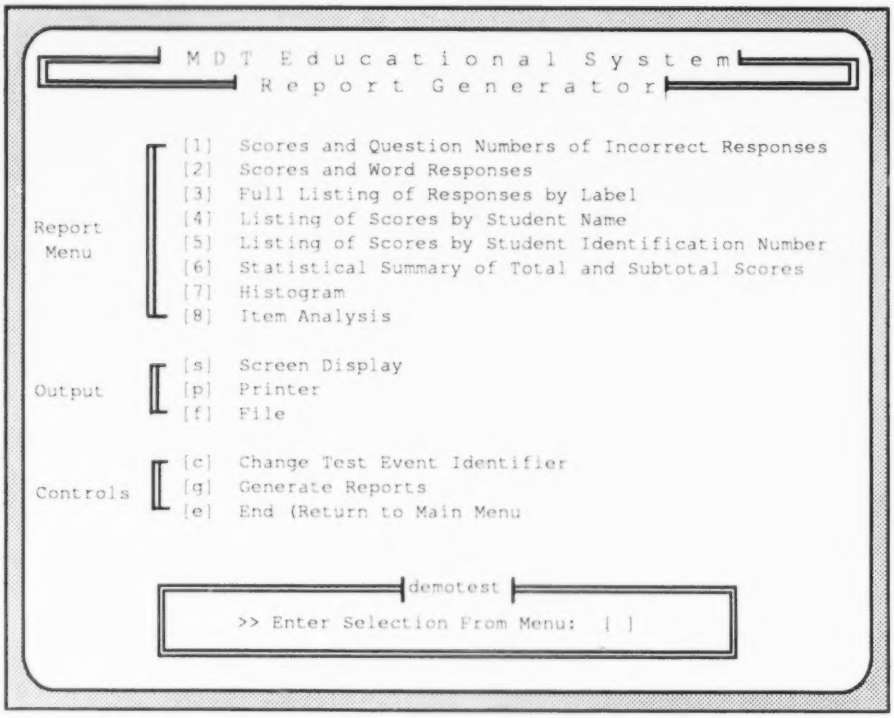

MDT Educational System
Report Generator
Report Menu
[1] Scores and Question Numbers of Incorrect Responses
[2] Scores and Word Responses
[3] Full Listing of Responses by Label
[4] Listing of Scores by Student Name
[5] Listing of Scores by Student Identification Number
[6] Statistical Summary of Total and Subtotal Scores
[7] Histogram
[8] Item Analysis
Output
[s] Screen Display
[p] Printer
[f] File
Controls
[c] Change Test Event Identifier
[g] Generate Reports
[e] End (Return to Main Menu
demotest
>> Enter Selection From Menu: [ ]

Figure 4-9: Monitor Screen for Standard Reports

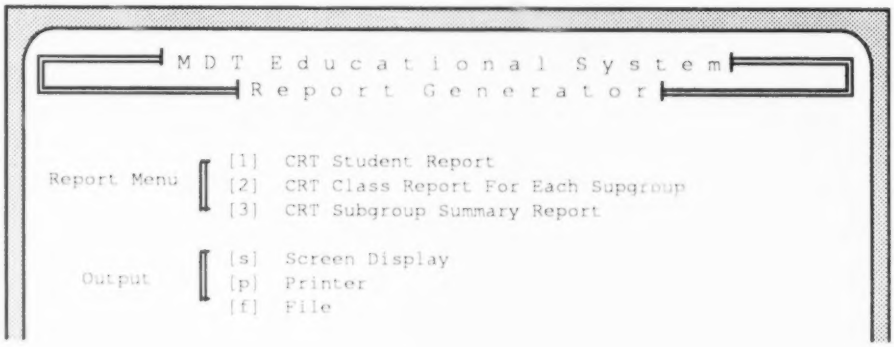


Figure 4-10: Monitor screen for CRT Reports
The lower part of the screen is identical to Figure 4-9.

The output mode selection is set for the screen unless you change it. To print on paper or create a file, type [p] or [f]. Press <Enter>. Type [s] and press <Enter> to return to the screen option.

It is best to send the reports to the monitor screen the first time. That way you can see the results without waiting for the printer to put them on paper. When reports are being displayed on the screen, press <ESC> to interrupt a report and press any other key to proceed to the next report.

Once reports and the desired output are selected, type [g] and press <Enter> to generate reports. Note that no processing occurs until option [g] is selected and entered to generate whatever is designated on the menu. More information is provided in the *User's Guide*. Sample reports are presented in Chapter 5 of this report.

4. Grade Book

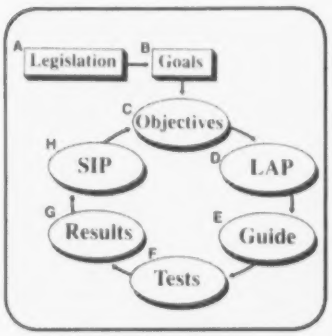
To use the Grade Book program, you should read Section 7 of the *User's Guide*. It is easy, but there are numerous options that you might want to utilize. The Grade Book is of particular importance to users of card readers and ScanTron scanners with which there are no machine-readable student names on the answer forms. If names and ID numbers are in a grade book class and if that class is specified for the specific test event via the Test Maker program, then the student names will appear wherever appropriate on the generated reports. In other words, a grade book class will function as a database file of student names and ID numbers.

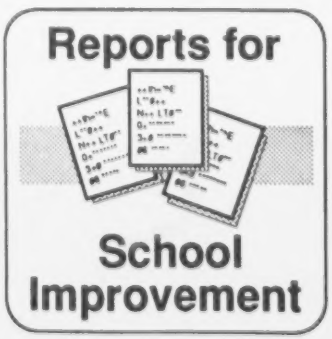
* * *

The steps discussed above really are as easy as they sound. The hard work is done by the environment of the MDT Educational System. You, the use/operator, are protected in dozens of unseen ways from mistakes so that your data remain intact and pure.

The ISBE requested specific "how to do it" information in this report. This chapter has told you far more than what Kay Pierson knew when she started processing the Bureau County tests. Even so, she said the "MDT Educational System software gives new meaning to the phrase 'user friendly.'"

5 Assessment Results and School Improvement





A • What Does All This Mean?

Everything discussed earlier in this report would be meaningless without this final chapter. To some extent this chapter represents the completion of the first round of the cycle of school improvement shown in Figure 1-1. Use of the assessment results to formulate the School Improvement Plan (SIP) to send to the ISBE **appears** to be the culmination. A cynic would say "The wishes of the bureaucracy have been served and it is over until next year." But educators say, "The assessment results can help us improve the teaching and learning of the children, so this is really the start."

School improvement (without the word "plan") is the real issue that underlies the entire cycle of efforts. The word "improvement" implies knowing the present level and

then seeking to attain a higher level. The assessment results generated by the cycle assist in the improvement process. First, the student scores that were so carefully gathered for each of the many CRT learning objectives reveal the heights and depths of the current situation. That information is known (or can be attained from the computer) for each student, classroom, teacher, building, and district, all for each learning objective, for each broad goal, and for each learning area at each grade level. In the first year very little comparative data exists about previous equivalent populations, but at least some starting information has been generated. The heights of accomplishment should be recognized and credit given where it is due. There should be much congratulating for the favorable accomplishments at every level.

The second part of improvement is the seeking of higher levels for the weaker areas. The CRT process permits multiple subtests to be viewed so that intelligent conclusions can be made to determine exactly for which learning objectives the improvements are to be sought. Once the "what to improve" is determined, then the "how to improve" can be formulated. Any number of factors must be considered, ranging from a faulty assessment instrument or curriculum guide to insufficient time-on-task by the student. There are too many factors to enumerate here. More important is the recognition that qualified educators in the school district will be able to examine the assessment results plus other records and then map out the ways to improve education. They will also send the SIP report to the State Board of Education, but that is only a small tip of the iceberg of efforts for improvement.

To accomplish this most worthy task called school improvement, effort is necessary. Fortunately, the efforts discussed in Chapters 1 and 2 make the school improvement work easier. The learning objectives are clear; the test is appropriate; and students have marked their answers. At this point the computer hardware and software must meet the needs of the school district and its people. Those needs are for clear, coherent, powerful, descriptive and analytical reports. The test scoring and reporting system provides the tools and printed results. The people still do the final interpreting and decision making.

The sections which follow present the selection of reports available to the Bureau County school districts and others using the software. The sections are organized according to the person's position in the approximate chronological order of viewing the computer-generated results. Several of these persons and positions of responsibility will sometimes reside in one person, especially in small school districts. Nevertheless, the functions of the separate positions are distinct, as are the specific needs for data. In approximate chronological order of viewing the results, the positions are the following:

1. the assessment coordinator
2. the district administrator
3. the district school board
4. the State Board of Education
5. the general public/taxpayers
6. the classroom teachers
7. the parents and students

The order does not imply importance. [If it did, the truly important ones are the lowest on the list.] Nor is there any reason to postpone giving the applicable results to one group, for example the teachers, simply because another is delayed in viewing the results. Note that the early recipients of the results are focused on aggregate data. Only the teachers, principals, parents, and students receive and use data that identifies specific students.

The magnitude and interrelationships of this task are represented in Figure 5-1. The chart shows how each of six (6) levels of educational structure would utilize different selections from eight (8) computer-generated reports from one criterion referenced test. For example, at the level of a single school building (or principal), five reports are appropriate. Several of those reports contain numerous parts, such as the histograms (MDT Standard Report 7) which are generated for each learning objective as well as for the total test.

Level of Aggregation	Standard MDT Reports					CRT Reports			No. of Reports for one entity	Additional Information to use at each level	Reports Compiled at each level	Example: Based on BCLAC 3rd Grade Reading Test 4/88	
	Std3	Std4	Std6	Std7	Std8	CRT1	CRT2	CRT3				No. of Entities	Distinct Reports
	Data dump with names		Stats (For each objective)	Histogram	Item Analysis	Student Summary (Individ.)	Class by Learning Objective	Subgroup Summary					
Assessment Totals (A) (Assessment Coordinator)	*	*	*	*	*			*	6	Pre-test results and previous year's results	Summary A: Analysis of total test	1	6
District (D) (Superintendent and School Board)			*	*	*			*	4	Summary A from above	Summary D: Analysis for District	16	64
Building (B) (Principal)			*	*	*		*	*	5	Summary A Summary D	Summary B: Analysis for Building	17	25 [2 bldg. in 1 Dist.]
Teacher (T)			*	*	*	*	*	*	6	Summary A Summary D Summary B	Comments T: Parent/ Teacher Conferences	22	72 [10 teachers in 4 Dist.]
Class (C) (When teacher has more than one class for same test)			*	*		*	*		4	[Same as for Teacher Level]	[Same as Comments T]	NOT for 3rd Grade	NOT for 3rd Grade
Students (S)						*			[incl. above]	[Comments T]	Plans for instructional remediation, if needed	320	[incl. above]

Total = 167 Distinct reports for one grade level for one area of learning

Figure 5-1: Chart of Appropriate Reports for Different Uses

As noted in the two columns entitled "Additional Information" and "Reports Compiled," the personnel at each level also should receive an appropriate Summary Report of aggregate data from each higher level. The aggregate data summaries provide valuable "averages" to help identify strengths and areas for school improvement efforts.

The total number of distinct computer-generated reports (not counting photocopies) needed for one CRT test depends upon the configuration of the entities that use the test. Figure 5-1 shows an example for the April 1988 experience in Bureau County. Of the sixteen districts (Level D) with third grade classes, only one district had two elementary school buildings (Level B). In other words, fifteen districts could use sixty (60) of the district level reports, unaltered, for their fifteen buildings, plus generating a CRT Report No. 2 for each building. The district with two buildings would need a new set of five reports for each building. The grand total for new (distinct) reports at the building level is only twenty-five in this example. [Note that 60 + 25 = 85 = 17 x 5].

Figure 5-1 with the BCLAC example illustrates several important aspects of CRT testing for school improvement:

a. Many reports (167 in the BCLAC example) are generated for one test for one grade level. As a second example, a single district with three buildings with two classes in each could generate thirty-three distinct reports for one test.

b. When calculated for three grade levels (3rd, 6th, and 8th), approximately five hundred (500) distinct reports could be generated by computer for the Language Arts assessment of the BCLAC, or one hundred reports for the second example.

c. Based on the estimated cost (see Section 2.D) of $30,000 to prepare the three assessments, the cost per report would be $60 in the first year in BCLAC (or $300 in the second example). In subsequent years the costs would be only $15 (or $75 in the second example.)

d. When additional learning areas (mathematics, science, etc.) plus the 11th grade classes are added to the assessment activities, the number of distinct reports that a school district or cooperative might generate could become four to eight times greater in the coming five years.

Perhaps this scenario with hundreds of reports seems daunting, but in reality the situation is highly favorable. Consider the following additional aspects:

e. The computer and software are specifically designed to do highly repetitious tasks, so the report generation will be a relatively easy endeavor.

f. The investment in software and hardware to do all these reports is extremely economical because the system can be used in successive years. These tools are within reach of most schools individually or through cooperatives and will save hundreds of hours of time for school administrators and teachers.

g. AND ESPECIALLY IMPORTANT: A large number of reports appropriate to each level and with meaningful results can greatly enhance the prospects for significant school improvements. Simply stated, the reports are the key to understanding where and how to seek school improvement at all levels from the top where objectives are defined down to the individual student who needs specific assistance.

As shown in Figure 5-1, in addition to a one-page summary per student, dozens of different relevant and valuable sets of information could be generated to obtain the easily extracted value of one good criterion referenced test. These reports should be processed and put to maximum use if the intended school improvement is to be accomplished. The computer and software are poised to produce the reports. The remainder of this chapter discusses the actual usage of those reports.

* * *

To help the user maintain order among these myriad reports, the selected MDT software generates a "header" on each printed page. (See Figures 5-2 through 5-6). The date of the processing is shown. The "Test" name matches the identifier of the test event that was processed to generate the report. (The "List" and "Class" designations are primarily for in-course classroom testing and are not needed for the reports except when student names must be retrieved from a grade book class.)

The test names used in several examples in this publication signify the "joined classes of all third grades in Bureau County" (bc3join) and "third grade students of Western Community District 306" (306we3).

Note: Several of the reports shown in this chapter have been altered to illustrate some of the variety and extremes of what might occur. All student names are changed. Therefore, these results are not true representations of the Bureau County assessments in 1988. Annotations, size reductions, minor layout changes and several printers of different qualities have been used for the reports shown in this publication.

B. Reports for the Assessment Coordinator

The individual, committee or consulting firm that serves as the assessment coordinator has the double duty of cleaning up the data and certifying that the results are meaningful.

1. Data clean-up (MDT Standard Reports Nos. 3 and 4)

Whenever several hundred students respond to one test in different rooms with different supervisors, there are possibilities of errors in the collection and initial processing of the data. Problems such as marking the answer forms or even scanning and scoring with the wrong answer key can occur. The examination supervisors and the user/operator need to perform their duties properly; the assessment coordinator must watch over this and be alert to anomalies that may appear at any time in the analysis and reporting process. One way to detect problems of data collection or processing is to review the patterns of student answers as recorded by the scanner and microcomputer. This should be done on a class by class basis prior to any joining of the classes. Either on the monitor screen or on a paper printout, MDT Standard Report No. 3 shows every student response (see Figure 5-2). (Student names are from MDT Standard Report No. 4.)

In MDT Standard Report No. 3 the students are on the lines and items (test questions) are in the columns. Under each question number is the answer as recorded on the answer key. Student responses are on subsequent lines. A dot (.) means the student's answer matched the answer key. A letter (A, B, C, D, E) is the student's answer that was incorrect. The coordinator should look for dashes (-) and blanks ( ). The dashes signify that the scanner/computer/software system was unable to distinguish between two marks the student made in the same question response area. This could have been intentional, a bad erasure, an inadequate scanner, a misaligned sheet, or simply the mark for the

answer to the next question being placed in the wrong area. The equipment and software cannot tell the difference, but the coordinator can make a decision based on common sense. A few of these marks randomly dispersed would be normal. Many dashes throughout the report may indicate equipment deficiencies. Many dashes for one student could mean improper scanning or improper marking, such as by a student with deficient small motor skills needed to control the placing of the marks. One dash followed by a blank or by many incorrect responses that would have been correct for the subsequent questions indicate that the student possibly marked in the wrong places.

```
-- M --          T e s t  : bc3join
-- D --          L i s t  : *                D a t e: May 04, 1988
-- T --          C l a s s: *

                 Report 3: Full Listing of Responses by Label

-----Student-----  ----------------Question Number-----------------
Obs Scn ID         #00000 #00001 #11111 #11112 #22222 #22223 #33333
Num Num Number      12345  67890  12345  67890  12345  67890  12345
--- --- ---------  ------ ------ ------ ------ ------ ------ ------
Key                BCDAC  ACBCD  AC     CDABA  DCDBA  CB CC  BACB

  1 333 126    115  .....  .....  ..ACB  .....  C....  ..CD.  .BBAA
  2 162 300    117  .A...  .....  ..ACD  .....  B....  ..DB.  A...A
  3  59 28 5  115  ....A  D....  D.ADA  AB.CC  A....  ..D..  A..CA
  4  15 306    101  .....  ...D.  ..ACA  .....  .....  ..DBE  E..CA
  5 128 099    21   .....  CA.D.  ..BDA  ...D.  .....  ..D..  A-BCA
  6 166 307    101  .....  .....  ..ABA  .....  .....  .AC..  .B..A
  7 146 300    101  ....D  D....  ..ACA  .....  .....  ..DD.  AB..A
  8  95 099    401  ABCCB  .DDDB  B.DCC  B.CDC  C.AC.  ACCD.  .B.CA
  9 163 300    118  CE.BA  CBEDA  DEEBD  E.ECE  ABCDE  A.CDE  AB.DE
 10 147 300    102  ..A.B  ...A.  ..DAD  ..BAC  .D...  ..C..  ..BCA


-- M --          T e s t  : bc3join
-- D --          L i s t  : *                D a t e: May 04, 1988
-- T --          C l a s s: *

                 Report 4: Listing of Scores by Student Name

                                                ----------Subtotals----------
   Student Name                ID Number  Tot  S1  S2  S3  S4  S5  S6  S7  S8
   --------------------------- ---------  ---  --  --  --  --  --  --  --  --
   (Max) -->                              61   7   6   5   4   6  10   6   7

 1 *** No Name Available *** 126    115   52   6   6   1   3   5   9   6   7
 2 ----KSJ                   300    117   48   6   5   5   1   2   9   6   5
 3 ADDIS CHARLES G           28 5   115   43   7   4   4   3   3   5   5   3
 4 ALBERT CHRISTY B          306    101   48   6   6   3   3   2  10   5   5
 5 ALBRECHT JEROME G         099    21    46   7   5   2   3   4   9   4   5
 6 ALCORN JASON L            307    101   42   2   6   3   1   2  10   6   5
 7 ALDERMAN BRANDI J         300    101   48   7   4   2   2   3  10   6   5
 8 ALDERSON JOHN T           099    401   19   5   1   1   1   1   3   1   2
 9 ALDRICH RAY E             300    118   16   3   1   1   0   2   1   0   0
10 ALDRIDGE JOHN D           300    102   44   5   4   3   4   4   6   5   7
```

Figure 5-2: MDT Standard Report 3: Full Listing of Responses by Label

The blanks mean "no response." Blanks should not occur frequently in a multiple choice test. Also, many blanks for the final questions indicate that the student(s) did not have sufficient time to complete the test.

What does the coordinator do in such cases? He or she must make a decision depending on the evidence. Ignore the few; re-scan the many; pull out and correct and re-scan the individual; eliminate from later analyses the questions that were not attempted; or make a list of the special case students whose individual results must be treated separately.

The main point is that this chance to review the responses is the last realistic opportunity to see the students as individuals before the aggregate data analyses and reports are generated and disseminated far and wide. Yes, the individual results are seen again, but only much later by the classroom teacher, possibly at a meeting with the parents and student. At that time it is a little late and slightly embarrassing to discover that a student's CRT scores were actually in the 80s and 90s percentiles, and not in the 40s that the computer reported.

Moral: A little time for review of the raw data as "seen" by the computer is highly justified, especially considering the efforts already expended and the importance of the final results.

2. Aggregate data vs. class data

Once the data entry is clean for each separate class, the user/operator needs to join together progressively all of the classes that responded to the same assessment instrument. At least five meaningful groupings of students taking the same test can be identified and saved separately as the joining takes place:

a. individual classes (Level C in Figure 5-1)
b. all classes of the same teacher (This is common at higher grades, not at elementary levels.) (Level T in Figure 5-1)

c. all classes within one building (or under the administration of one principal) (Level B)
d. all classes in a school district (Level D)
e. all classes that took the same assessment (Level A).

Each grouping has significance to the people involved. The work of the assessment coordinator being discussed in this section is clearly at the fully aggregated level which is "A." In subsequent sections, some of the same reports discussed below will again be useful, but the report should be for a specific group of students by class, teacher, building or district.

3. Item Quality (MDT Standard Report No. 8)

The assessment scores are the results of a series of test questions called "items." Item analysis is a well established report and the assessment coordinator uses it for the fully aggregated data. (See Figure 5-3). For each separate item the responses given are listed along with the number and percentage of students who marked that response. The correct response that was specified on the answer key is shown with pointed brackets (<B>).

The MDT software also prints the difficulty level, which by tradition is the decimal equivalent of the percentage of students who answered correctly. The value of 1.000 means 100% answered correctly.

The discrimination index is the proportion answering correctly of the top scoring 27% of the tested students minus the proportion answering correctly of the lowest scoring 27% of the tested students. The discrimination index can range from +1.0 (all top students and no lowest students answered correctly) to -1.0 (reversed proportions). The value 0.0 means equal proportions answered correctly.

Note that "discrimination" in this statistic is scholastic and is not based on race, gender, religion, etc. A better term to refer to those latter cases is "bias" which is discussed separately in Section 5.B.8.

```
-- M --          T e s t  : bc3join
-- D --          L i s t  : *                D a t e: May 24, 1988
-- T --          C l a s s: *

                                Report 8: Item Analysis

Q19     Responses  Frequency  Percent
              -          1      0.276
              A         36      9.945
            <B>        260     71.823
              C         32      8.840
              D         33      9.116
Difficulty: 0.718   Discrimination: +0.561

Q20     Responses  Frequency  Percent
                           1      0.276
              -            2      0.552
            <A>          315     87.017
              B            9      2.486
              C           21      5.801
              D           12      3.315
              E            2      0.552
Difficulty: 0.870   Discrimination: +0.357

Q21     Responses  Frequency  Percent
              -            5      1.381
              A           35      9.669
              B           87     24.033
              C           79     21.823
            <D>          156     43.094
Difficulty: 0.431   Discrimination: +0.398

Q22     Responses  Frequency  Percent
              -            1      0.276
              A           13      3.591
              B           15      4.144
            <C>          284     78.453
              D           49     13.536
Difficulty: 0.785   Discrimination: +0.459
```

Figure 5-3: MDT Standard Report No. 8: Item Analysis

Item analysis, difficulty and discrimination indices reveal a great deal about each test question and are valuable to the test designer. Each item can and should be tracked each time it is used, whether in a real test or in a pilot assessment. In CRT testing the difficulty levels of previously used items for a learning objective are useful in determining the criterion and expectation levels during the selection of questions for a test.

The balance between difficulty and discrimination merits careful attention. For example, if difficulty is 1.0 or 0.0, then the discrimination

must be 0.0. Furthermore, very high discrimination values can only occur when the difficulty levels are toward the central figures ranging from 0.3 to 0.7 because more than 27% and less than 73% of the students would need to miss the question.

Item analysis and the supporting indices are major tools for the assessment coordinator to use in the final judgment of each item. Based on such evidence, any unsuitable question may be eliminated prior to the major data processing and reporting that is sent to the other users. But such decisions come only after further analyses by the assessment coordinator.

4. Statistical Summary and Histogram (MDT Standard Reports Nos. 6 and 7)

Educators know they must look beyond the individual questions toward the subgroupings of questions according to the learning objectives. For the Assessment Coordinator, the next look is at the statistics for the joined test events, that is, where all students who took the test are analyzed together. The focus is on the test and its subtests, not on the students. The total test scores are interesting, but they are almost irrelevant because the test was designed as a combination of numerous subtests.

The MDT Standard Report No. 6 provides a statistical summary (See Figure 5-4) while Report No. 7 presents the data visually in a histogram (Figure 5-5). These results are provided for the total test and, most important, separately for each learning objective.

Much of the interpretation is obvious. A few key points to check are given below.

a. "Quantiles" are expressed as quartiles (quarters) plus specific quantiles of one percent, five percent and ten percent at the top and bottom of the distribution.

b. "Extremes" are a list of the actual scores attained by the top five and lowest five students. Extremes have greater importance with low numbers of students, as in class groups.

c. Each asterisk represents one student. Each number is an attainable score, starting at the highest score possible, and "sd" means standard deviation.

d. The distribution is probably skewed. Expect the curve to be top-heavy with an extended tail to the low scores. Criterion Referenced Tests are constructed differently from Norm Referenced Tests with bell-shaped curves.

```
-- M --          T e s t  : bc3join
-- D --          L i s t  : *                D a t e: May 04, 1988
-- T --          C l a s s: *
```

Report 6: Statistical Summary of Total and Subtotal Scores

Grand Total Score

Moments		Quantiles				Extremes			
Total Number	362	100% Max	60	99%	58	Highs	60	Lows	10
Mean	42.823	75% Q1	49	95%	54		58		12
Standard Dev.	9.612	50% Med	45	90%	53		58		14
Median	45	25% Q3	39	10%	29		58		14
		0% Min	10	5%	21		57		15
				1%	14				

```
-- M --          T e s t  : bc3join
-- D --          L i s t  : *                D a t e: May 04, 1988
-- T --          C l a s s: *
```

Report 6: Statistical Summary of Total and Subtotal Scores

Subtotal Score 6

Moments		Quantiles				Extremes			
Total Number	362	100% Max	10	99%	10	Highs	10	Lows	0
Mean	7.688	75% Q1	9	95%	10		10		1
Standard Dev.	2.125	50% Med	8	90%	10		10		1
Median	8	25% Q3	7	10%	5		10		1
		0% Min	0	5%	4		10		1
				1%	1				

Figure 5-4 MDT Standard Report No. 6: Statistical Summary

```
-- M --          T e s t  : bc3join
-- D --          L i s t  : *                D a t e: May 04, 1988
-- T --          C l a s s: *

                        Report 7: Histogram

          61
          60 *
          59
          58 ***
          57 *
          56 ********
          55 *****
          54 **************
+1sd      53 ***********
          52 ********
          51 **************
          50 ************************
          49 ********************
          48 ********************************
          47 ********************
          46 ********************
median    45 ***************
          44 ************************
mean      43 ***************
          42 ************
          41 ***************
          40 ***********
          39 *************
          38 ********
          37 *******
          36 **********
          35 *******
          34 *****
-1sd      33 ***
          32 **
          31 *****
          30 **
          29 *****
          28 ***
          27 **
          26 *
          25 ****
          24 **
-2sd      23 **
          22 *
          21 **
          20 ***
          19 ****
          18 **
          17 **
          16 **
          15 *
          14 **
-3sd      13
          12 *
          11
          10 *
           9
           8
           7
           6
           5
           4
           3
           2
           1
           0
```

```
-- M --          T e s t  : 3vbwe3
-- D --          L i s t  : *
-- T --          C l a s s: *

                        Report 7: Histogram

                        Subtotal Score &

+1sd          10 ********
mean med       9 ********
-1sd           8 *****
-2sd           7 ****
-3sd           6 **
               5
               4
               3
               2
               1
               0
```

Figure 5-5: MDT Standard Report No. 7: Histogram

e. The subgroup histograms and statistics reveal the combined effect of the specific questions that were seen separately in the item analysis. Single questions that are poor discriminators or highly difficult or simply unanswered because of lack of time can have inappropriate negative impact on statistical analyses of any complete test, and ghastly impact on a subgroup with only a few questions.

f. bias. (See Section 5.B.8)

g. Student attainment of the criterion level and the class attainment of the expectation level can be shown. Although the computer program currently does not mark the criterion level on the histogram, each "cut-off point" of 60%, 75%, (or whatever is used) can be quickly determined. (The criterion level times the maximum points possible equals the minimum acceptable score. For example, 60% x 61 points = 36.6 points). By marking that criterion level on the histogram, the number of students (one per asterisk) who attained the criterion can be seen and compared with the district's expectations. (The precisely-calculated percentage of attainment is given in CRT Report No. 3.) Of great importance are the number of students who were borderline cases either above or below the minimum acceptable score. This distribution can be readily seen on the histogram. Of special interest are the students within one missed or correct question of the criterion level, thereby having major influence on the percentage of attainment. Such information can be highly revealing when subtests contain very few questions. Further information about the number and percentage of students who met the criterion level is provided in the next report to be discussed.

5. *CRT Subgroup Summary (MDT CRT Report No. 3)*

The MDT printout called CRT Report No. 3 (not to be confused with Standard Report No. 3) is a summary of results for each learning objective. An example is in Figure 5-6. Up to 25 subgroups are permitted in each test event. Subgroup designations can be specified and changed from the Test Scorer program. An optional written descriptive name for each subgroup is planned for 1989.

```
-- M --          T e s t  : bc3join
-- D --          L i s t  : *                    D a t e: May 04, 1988
-- T --          C l a s s: *

                  Report 3: CRT Subgroup Summary Report

Subgroup  Criterion  Number   Number Who    Percentage Who  Kuder-Richardson
 Number     Level    Tested  Met Criterion  Met Criterion      Formula 20
--------  ---------  ------  -------------  --------------  ----------------
     1      60.000     362        290          80.110           0.813
     2      60.000     362        270          74.586           0.580
     3      60.000     362        159          43.923           0.016
     4      60.000     362        148          40.884           0.256
     5      60.000     362        189          52.210           0.568
     6      60.000     362        306          84.530           0.728
     7      60.000     362        297          82.044           0.581
     8      60.000     362        180          49.724           0.406
     9      60.000     362        316          87.293           0.449
    10      60.000     362        274          75.691           0.680

Kuder-Richardson Formula 20 For Entire Test = 0.887

-- M --          T e s t  : 306we3
-- D --          L i s t  : *                    D a t e: May 12, 1988
-- T --          C l a s s: West3

                  Report 3: CRT Subgroup Summary Report

Subgroup  Criterion  Number   Number Who    Percentage Who  Kuder-Richardson
 Number     Level    Tested  Met Criterion  Met Criterion      Formula 20
--------  ---------  ------  -------------  --------------  ----------------
     1      60.000      27         25          92.593           0.783
     2      60.000      27         23          85.185           0.363
     3      60.000      27         15          55.556           0.181
     4      60.000      27         11          40.741           0.138
     5      60.000      27         13          48.148           0.589
     6      60.000      27         27         100.000           0.475
     7      60.000      27         27         100.000           0.012
     8      60.000      27         11          40.741           0.360
     9      60.000      27         25          92.593           N/A
    10      60.000      27         26          96.296           0.197

Kuder-Richardson Formula 20 For Entire Test = 0.717
```

Figure 5-6: MDT CRT Report No. 3: CRT Subgroup Summary Report

The criterion level for each separate subgroup is specified via the CRT Report Generator program. Levels are expressed as percentages (that is, 75.000 means 75%) and not as decimal percentages.

The column for "Number Tested" is the total number of students processed. The current limit of 500 students in any test event will be raised in new releases of the software.

The "Number Who Met Criterion" is calculated for each subgroup/learning objective. That number is also expressed as a percentage in a separate column.

The percentage figures should be scrutinized. These numbers will probably be sent to the ISBE and possibly even be published in local newspapers and/or each school's report card. The percentages must not be altered after the assessment coordinator certifies that the test is valid, reliable, and useful for school improvement.

6. Test Reliability (MDT CRT Report No. 3)

The CRT Report No. 3 discussed above also provides a calculation of test reliability. Reliability, simply stated, is the ability of a test to provide similar results if the test were given a second time in similar circumstances. The Kuder-Richardson Formula 20 (KR-20) is a widely respected calculation to provide a conservative estimate of the split-half type of reliability measurement. (See R. L. Thorndike and E. P. Hagen, *Measurement and Evaluation in Psychology and Education* (4th edition), Macmillan, New York, 1977, pp 82-83, from which an extract is given on the next page.) The expected values of the reliability index for equally reliable tests (or subtests) have considerable variation depending upon the number of questions in each test. Acceptable index values commonly range from the mid 0.90's for over thirty questions to only 0.55 for tests or subgroups with only five questions. (See Homewood-Flossmoor, 1988, pp 36-37.)

The KR-20 formula for test reliability estimated from item statistics (From Thorndike and Hagen, 1977, pp.82-83) is in the box below.

$$r_{11} = \left(\frac{n}{n-1} \right) \left(\frac{s_t^2 - \Sigma pq}{s_t^2} \right)$$

where p is the proportion passing the item, and
q is the proportion failing the item.
n is the number of items in the test,
s_t is the standard deviation of the test,
Σ means "take the sum of" and covers the n items.

"This formula, called Kuder-Richardson Formula 20 after the names of the originators and the numbering in their original article, provides an estimate of what is called the internal consistency of a test — the degree to which all of the items measure a common characteristic of the person. When the test is homogeneous, in the sense that every item measures the same general factors of ability or personality as every other item, coefficient alpha and the Kuder-Richardson estimates have essentially the same interpretations as the odd-even coefficient [for split halves of test reliability]. The Kuder-Richardson estimate likewise (1) takes no account of variation in the individual from time to time, and (2) is inappropriate for speeded tests. Within these two limitations, it provides a conservative estimate of the split-half type of reliability."

7. Population Separation

The MDT software is incorporating in 1989 the ability to subdivide any set of respondents according to any characteristic that is marked for scanner reading. (Alternative methods of separation are also being considered.) This capability was specifically commissioned by the Bureau County Learning Assessment Cooperative for purposes of separating Special Education test takers from the regular student population. For most purposes the Special Education population is reported separately. The assessment coordinator should seek and follow the school district's guidance as to which populations should be separated. If the decision is

to process the two (or any other) populations separately, follow the separation instructions that will be provided with that software option, and then separately print the desired reports for each population. Note that the use of subpopulations can dramatically increase the number of reports to be generated. Careful planning is encouraged.

8. Bias

Bias is an extremely serious issue. The assessment coordinator must constantly consider the possibility of bias, search for it and eliminate any test items of doubtful quality. One of the best detectors of bias is the comparison of the item analyses for the same question according to identified subpopulations, such as male/female or minority/non-minority students. The population separation routine discussed above will be very useful, provided the characteristics of all students are marked on the answer sheets or are otherwise accessible to the computer.

9. Adjustments of the Assessment Instrument

Any of several reasons could require adjustments to the test. An error in the answer key, a biased question, a poorly worded question, a shift in the subgroups, the combining of closely-related learning objectives, and other unforeseen complications could mean the elimination of a question or some other alteration to the subgroups that are identified for the learning objectives. All of the efforts discussed in this Section 5.B have been directed only toward certifying that the test was indeed meaningful. If, on the other hand, the test is found to lack validity and reliability, then it must not be certified and there is no purpose in further reports except to learn to make better assessment instruments. Alternatively, the assessment coordinator can express reservations along with basic approval of some or all of the subtests. Whatever the case, when the assessment coordinator can declare and justify a test (or learning objective subtest) as having reasonable validity and reliability, then all viewers of the subsequent reports and analyses can have reasonable confidence when using the test results for the improvement of the school and its students.

If the review and certification process of the assessment instrument appears to be a major task, that is correct. The consolation is that many of these issues were already addressed during the pilot testing of the questions. The curriculum team (primarily local teachers) worked hard to provide a bank of valid and reliable questions, from which the best were selected. If biased questions were eliminated in the initial rounds, the chance of bias in the final test items is greatly reduced. Clearly the software operations, the resultant reports, and the analyses described above can and should be conducted with the student responses to the pilot test(s). In other words, use the software power to process the pilot efforts.

Because use of the CRT approach is relatively new for most Illinois school districts, some learning by the test makers is also expected. Although not optimal, the admission of need to improve the assessment material will probably appear on more than one School Improvement Plan. What is important is that the improvement is started and makes significant progress with each yearly cycle.

C. Reports for the District Administrators

The first report to the district administrator is definitely the one prepared by the assessment coordinator. That report is referred to as Summary A" in Figure 5-1. If on the district superintendent's desk the sign says, "The buck stops here," then full information about the test as an assessment instrument is essential. Superintendents and key assistants, including principals, should read the preceding Section 5.B.

The second report consists of sets of statistical data, histograms, and the CRT summary reports for the entire district and for each school. (If more than one district used the same test, then global statistics should also be available.) The MDT Standard Reports Nos. 6, 7, and CRT No. 3 shown in the previous section could be used directly. The district-level staff and the building-level principals need the reports to describe each school and to understand how that school compares with the district averages. Here the planning for school improvement gets underway. Tables of data are prepared. Lists of expectations met and not met are written. Special circumstances, justifications, and rationalizations of what has happened are worked out. An outline of strengths and deficiencies is formulated along with notes on where and what improvements can and should be made. Everything is still tentative. The principals will want to see the breakdown of results according to each classroom. Someone will remember that funding is not available to do everything at once, so priorities are suggested and materials are gathered for presentation to the school board. There are no formats for such tabulations and reports at present, but at least some guidelines will eventually come forth from the BCLAC or other sources.

The administrators' use of the computer-generated results does not end here. Not only do they present the results to the school board and ISBE, the administrators also eventually coordinate and disseminate the results to their schools for use by classroom teachers, remedial specialists,

parents, and students. Furthermore, through the curriculum and assessment committees, the administrators oversee the utilization of the CRT results in the coming cycle of LAP, curriculum guide, assessment instrument and the resultant improvements evident one year later.

D. Reports for the District School Board

The processing was done by the administrators. The summary reports now go to the district school board for review, discussion and decisions. Additional data can be introduced, such as the results of other tests or reports from consultants. The options should be reasonably clear. Some improvements can come from better focus and revisions of the LAP and curriculum guide. Others relate to resource allocations, class sizes, staffing, and many other issues. The decisions that are made will directly impact the SIP report that must be sent to the ISBE. In short, the school board is expected to utilize the prepared results of the entire learning assessment process to formulate and implement school improvement in the district.

E. Report to the Illinois State Board of Education

The cycle of school improvement shown in Figure 1-1 includes the School Improvement Plan (SIP) that must be filed by each school district. There is no magic in the SIP. Data from CRT Report No. 3 can be reported directly. The example in Figure 5-6 (on the following two pages) is not intended to be a model of content, but it does show the SIP can be Short, Insightful and Potent.

How each school district chooses to present its School Improvement Plan is an individual district matter governed by the regulations of the ISBE. Clearly the results from the CRT assessments do play a major role because the assessments provide much of the data upon which the SIP can be based. Immediately evident from the computer-generated reports discussed in this chapter is the wealth and variety of the data. Also evident is that only very small segments of the results are actually forwarded to the ISBE. But that which remains behind is what gives credence to the summary results and provides a base for the school district to undertake its improvement activities.

Reading Assessment Results
November 1988

Name of School District: _____

Name of School: _____

Grade: _____

I. ANALYSIS OF LOCAL ASSESSMENT RESULTS

A. Provide a summary analysis of local reading assessment results.

Subgroup Number	Criterion Level	Number Tested	Number Who Met Criterion	Percentage Who Met Criterion
1	60.000	362	290	80.110
2	60.000	362	270	74.586
3	60.000	362	159	43.923
4	60.000	362	148	40.884
5	60.000	362	189	52.210
6	60.000	362	306	84.530
7	60.000	362	297	82.044
8	60.000	362	180	49.724
9	60.000	362	316	87.293
10	60.000	362	274	75.691

B. Identify areas in which student learning met or exceeded the expected levels of performance as specified in the district's Learning Assessment Plan.

No. 1 Locate information explicitly stated in the test.

No. 2 Summarize the important ideas of the text and the important supporting details.

ETC.

C. Identify areas in which student learning did not meet expected levels of performance as specified in the district's Learning Assessment Plan.

No. 3 Ask questions and make predictions about a passage prior to reading.

ETC.

II. IMPROVEMENT ACTIVITIES

A. List needed revisions in the district's learning objectives, assessment system, or expectations based on the analysis provided in Part I-A.

1. Results of the BCLAC Reading test for grade 3 will be reviewed carefully and revised as needed.

2. Expectations will remain the same as for 1988-89.

B. List school improvement activities with timelines related to each area in which student learning did not meet expectations as identified in Part I-C.

1. A review of classroom instructional objectives will be conducted to insure that appropriate instruction occurs for all regular classroom students (9/88-5/89).

2. Remediation programs in reading during the regular school term will be made available to students (9/88-5/89).

3. Summer school programs will be provided in the area of remedial reading/language arts as needed (6/89).

4. Homework assignments will be devised to meet individual student needs (9/88-5/89).

C. If appropriate, list improvement activities with timelines which can best be addressed or implemented at the district level related to areas in which student learning did not meet expectations as identified in Part I-C.

1. The BCLAC Reading Test for grade three will be analyzed and revised to reflect improvements indicated from the 1988 pilot year.

2. A comprehensive K-8 language arts curriculum guide will be implemented beginning with the 1988-89 school year.

III. REPORTING

Indicate whether the district used the same or different reporting procedures from those described in the Learning Assessment Plan. If the district has changed its reporting procedures, describe the changes.

The reporting procedures will be implemented as described in the August, 1987 Language Arts Learning Assessment Plan.

F. Reports to the General Public/Taxpayers

The aggregate data reports discussed thus far provide appropriate information to include in the school report card and to release in other ways to the public and taxpayers. Because the CRT assessment is essentially a local product, comparisons with other school districts are not possible nor even desirable. In the initial year of assessment of each additional learning area, the only comparisons are between the expectations and the actual results. However, real major value comes in the second and subsequent years when improvements can be demonstrated. Whether the school district is A+ or D- or anywhere in between, the public/taxpayers will be desiring demonstrable, documented improvement. Being local in origin and design, the school improvement activities, the district-wide goals, LAP, curriculum guide, and assessment instrument must certainly relate to the community. Therefore, the improvements should also relate to and be understood by the community.

G. Reports for Classroom Teachers

First, the classroom teachers need appropriate copies or extracts of the aggregate data reports discussed above. On Figure 5-1, these would be Summaries A, D, and B. Teachers need to know the statistics and histogram distributions for the district (and maybe for the school) with which they can compare their own results.

Class-level statistics and histograms are especially useful. The numbers of students are much smaller, but each asterisk on the histogram starts to represent an identifiable student.

CRT Report No. 3 is of diminishing importance as the aggregate level reaches smaller groups. More appropriate data is available with greater detail in CRT Report No. 2. (See Figure 5-8, the CRT Class Report for Each Subgroup.)

The purpose of CRT Report No. 2 is to inform the teacher about the performance of each class member for each subgroup or learning objective. Each student is named, as retrieved from the answer sheet. When no name is marked on the answer form, names can also be retrieved from the MDT gradebook class listing referenced in the Test Event. The identification (ID) number is obtained from the answer sheet or card. Scores of attained points (raw) are shown alongside the maximum points possible. That fraction is converted into the percent attained by each student. The criterion level is specified at the time of processing the CRT reports and is shown near the top of the report. Any student who does not attain that criterion level is identified with an asterisk. Sorting the report by name, ID number or ranked score will present the results in three useful ways.

```
-- M --          T e s t  : 306we3
-- D --          L i s t  : *                    D a t e: May 12, 1988
-- T --          C l a s s: West3

                Report 2: CRT Class Report For Each Subgroup

                          Subgroup 2
                    Criterion Level =  60.000

        Name              ID        Score      Percent      * = Below
                        Number     Raw/Max     Attained    Criterion Level
------------------------ --------- --------- ------------ ----------------
ALBERT CHRISTY B         306   101    6/6       100.000
ALEXANDER ROBERT V       306   201    5/6        83.333
ALTES CHARLES R          306   202    4/6        66.667
BATES DONALD M           306   104    5/6        83.333
COOPER MICHAEL J         306   203    6/6       100.000
DETWEILER BRIAN L        306   204    2/6        33.333          *
DUNAWAY DAVID S          306   105    6/6       100.000
EATON GREGORY M          306   106    3/6        50.000          *
ERWIN DALE E             306   107    6/6       100.000
FERNALD RONALD K         306   206    5/6        83.333
GEISELMAN DEBRA S        306   207    6/6       100.000
HAGAN JOHN K             306   108    3/6        50.000          *

                  Choice Of Sorted Order
                    [n]  Name
                    [i]  ID Number
                    [s]  Score (Subgroup)
                >> Enter Selection From Menu: [ ]
```

Figure 5-8: MDT CRT Report No. 2: CRT Class Report for Each Subgroup.

These assessment results have several purposes for the teachers:

a. The teachers can identify specific learning objectives that are well covered and others that merit greater attention to raise scores of the entire class next year.

b. The teachers can identify specific students who need additional assistance on specific learning objectives. If results are available during the current enrollment session, the teacher should use them to aid the student. In many cases the additional assistance will be provided by other teachers who will instruct the student in the next academic year. Those teachers should be provided assessment data about their incoming classes.

Note that the actual test questions were not issued to the teacher (nor to the parents or students). In addition to maintaining test security, confidential control of the assessment items helps diminish the temptation of "teaching to the test." The CRT assessment deals with clearly-stated learning objectives that are more important for school improvement than are individual questions. For these reasons there is little value in providing the Item Analysis report (Standard Report No. 8) for the classroom teacher. However, the building principal might use the item analysis with the teacher to identify strengths and deficiencies on specific topics.

H. Reports to the Parents and Students

The parents and students are listed together, but the emphasis is on the students. CRT assessment is not designed to provide meaningful score differentiations among the top half of the students. Those students exceeded the criterion level, period. Therefore, for many students and their parents the message from the CRT assessment is simply that the criterion levels were met.

For students who either did not attain the criterion level or were marginal, the CRT results can provide a tremendous diagnostic value. Since each test was essentially many subtests with specified learning objectives, the feedback to the student, parent and teacher is quite detailed. CRT Report No. 1 of the MDT System provides a separate page for each student (See Figure 5-9).

```
-- M --          T e s t  : 306we3
-- D --          L i s t  : *                    D a t e: May 24, 1988
-- T --          C l a s s: West3

                        Report 1: CRT Student Report

Name: DOE JOHN C                                  Total Score: 44 / 61 (Maximum)
ID Number: 306   106
```

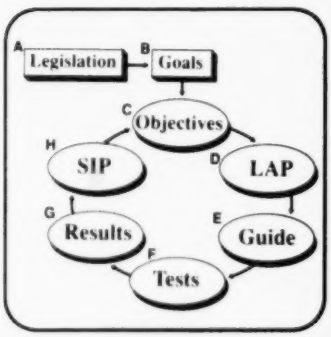
Subgroup ID	Subtotal Score Raw/Max	Percent Attained	Criterion Level	* = Below Criterion Level
1	7/7	100.000	60.000	
2	3/6	50.000	60.000	*
3	4/5	80.000	60.000	
4	2/4	50.000	60.000	*
5	3/6	50.000	60.000	*
6	7/10	70.000	60.000	
7	6/6	100.000	60.000	
8	3/7	42.857	60.000	*
9	4/4	100.000	60.000	
10	5/6	83.333	60.000	

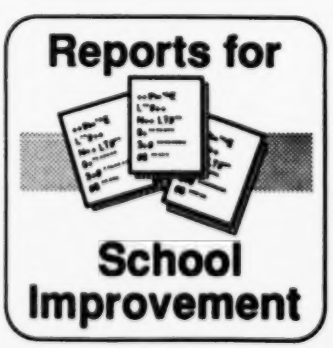
Figure 5-9: MDT CRT Report No. 1: CRT Student Report

Each subgroup has one line and (in the future) each can have a printed learning objective name. The subtotal score and the maximum points possible are shown for each subgroup. This is converted into percent attained. The criterion level is shown, along with an asterisk if the student's score was below the criterion level for the subgroup. Utilizing this information, the teacher and possibly others on the school staff can formulate a plan for remedial study.

Note: The MDT Educational Test Scoring System generates additional reports that are of major value for in-course testing but only would be used in the CRT situation if copies of the test were to be openly distributed to students, parents and the public. Standard Reports Nos. 1 and 2 identify each question the student missed. Standard Reports Nos. 4 and 5 list the students by name and/or ID number, plus their scores. Explanations and examples of these reports are printed in the *User's Guide* of the MDT System.

6 Conclusion





The cycle has gone full-circle when the results of one year's assessments have impact upon the subsequent round of planning, instruction, assessment and reporting. The process is impressive in its simplicity.

Throughout Illinois and the nation much work remains to be done. Many years are needed to assess the impact of "goals-directed" education. Fast answers are not possible, and deviation now from the chosen path is not advisable. The initial efforts indicate desirable results. In Illinois, the process has begun in full force.

Concerning the Bureau County experiences, the outcomes of the project are not only positive, they far exceed the initial expectations. As a result of hard work and fortuitous combinations of State support, regional leadership, committee members, consultants and suppliers,

an assessment methodology appropriate to Illinois' needs has evolved. By all measures used, it appears that this project can indeed serve as a model.

The two major divisions of the Bureau County Model Practices Project are closely related but quite separate:

(a) the construction of the assessment instrument, and
(b) the scoring and reporting mechanism of software and hardware.

The test construction and test scoring described in this report are NOT dependent upon each other. In other words, the assessment instruments and curriculum guide from Bureau County could be used with other software packages. Likewise, the selected MDT software package can process assessment results from any assessment instrument for which the student responses are marked on an appropriate answer card or sheet. However, coordination of the two major divisions is very important, as is illustrated in the Bureau County experience. Planning is essential.

Within Bureau County the impact is already noteworthy. The April 1988 results are actually usable, not merely a "dry run" learning experience. Enthusiasm is mounting for the 1989 language arts assessment. The decision has recently been made by the school districts in the cooperative to extend the assessment and reporting process to all grade levels, not just the mandated 3, 6, 8, and 11 levels. The steering committee and consultants are currently exploring the possibility of expanding the reporting process to include a diagnostic/prescriptive component in the software package. The power of computer-assisted analyses is just beginning to be tapped.

It is important to note that assessment other than by machine-scored tests may be used. The Bureau County Cooperative and many other school districts are actively pursuing assessment components with writing samples, oral responses, and longitudinal observation of the stu-

dents by qualified teachers. The Bureau County efforts with the above-mentioned non-test methods include an additional component: How can the speed, cost savings, and statistical analysis power of computers and optical mark readers (scanners) be incorporated into the non-test methods of assessment? At present it is sufficient to state that the Bureau County Learning Assessment Cooperative feels strongly that computer-related technology has a diverse and important role in the entire arena of educational measurement.

Also, the word of success is spreading among the committees responsible for mathematics, biological and physical sciences, and social sciences. The ability to see the formats of the data and reports is a real advantage for those responsible for subsequent assessments.

For the Bureau County Learning Assessment Cooperative (BCLAC), this report is the conclusion of the initial "pilot" phases. The BCLAC is proceeding to the next stages. Additional computer-generated analyses and reports plus item banks for the diverse learning areas are being developed. Any school district desiring information or considering adoption of a similar route are cordially invited to contact Mr. Larry Marsh to explore avenues of mutual assistance. All of us share the common goal of excellence in education.

Acknowledgements and Credits

Steering Committee:

The following steering committee members are responsible for the products developed for this report as a result of the cooperative efforts of twenty-two school districts in Bureau County:

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Consultants:

What initially appeared to be an insurmountable task was accomplished with the full cooperation of teachers' committees and the capable guidance of consultants who were employed to assist in the development of the products discussed in this report. **Dr. James H. Stronge** and **Dr. Don A. McVeain** from Bradley University provided the leadership and expertise to synchronize the locally designed criterion referenced assessment instruments.

Sincere appreciation is extended to **Dr. Paul S. Anderson**, Associate Professor of Geography at Illinois State University. Dr. Anderson, who founded the MDT Corporation with assistance from the ISU Technology Commercialization Center, made possible the computer scoring and the reporting procedures for the completion of this project. Without his expertise and technical assistance the products developed in this project would have been delayed.

Supportive Organizations:

Special thanks go to the staff of the **Department of School Improvement Services** of the Illinois State Board of Education for their cooperation and advice during the development and implementation of this project.

C. W. Hamilton, Superintendent of the Educational Service Region (ESR) for Bureau County, and **William Novotney**, Director of Educational Service Center No. 9, earned the gratitude of everyone through their organizations' support and encouragement of this project.

Finally, without the cooperation of the **twenty-two Bureau County school districts**, a project of this magnitude would have been impossible to accomplish.

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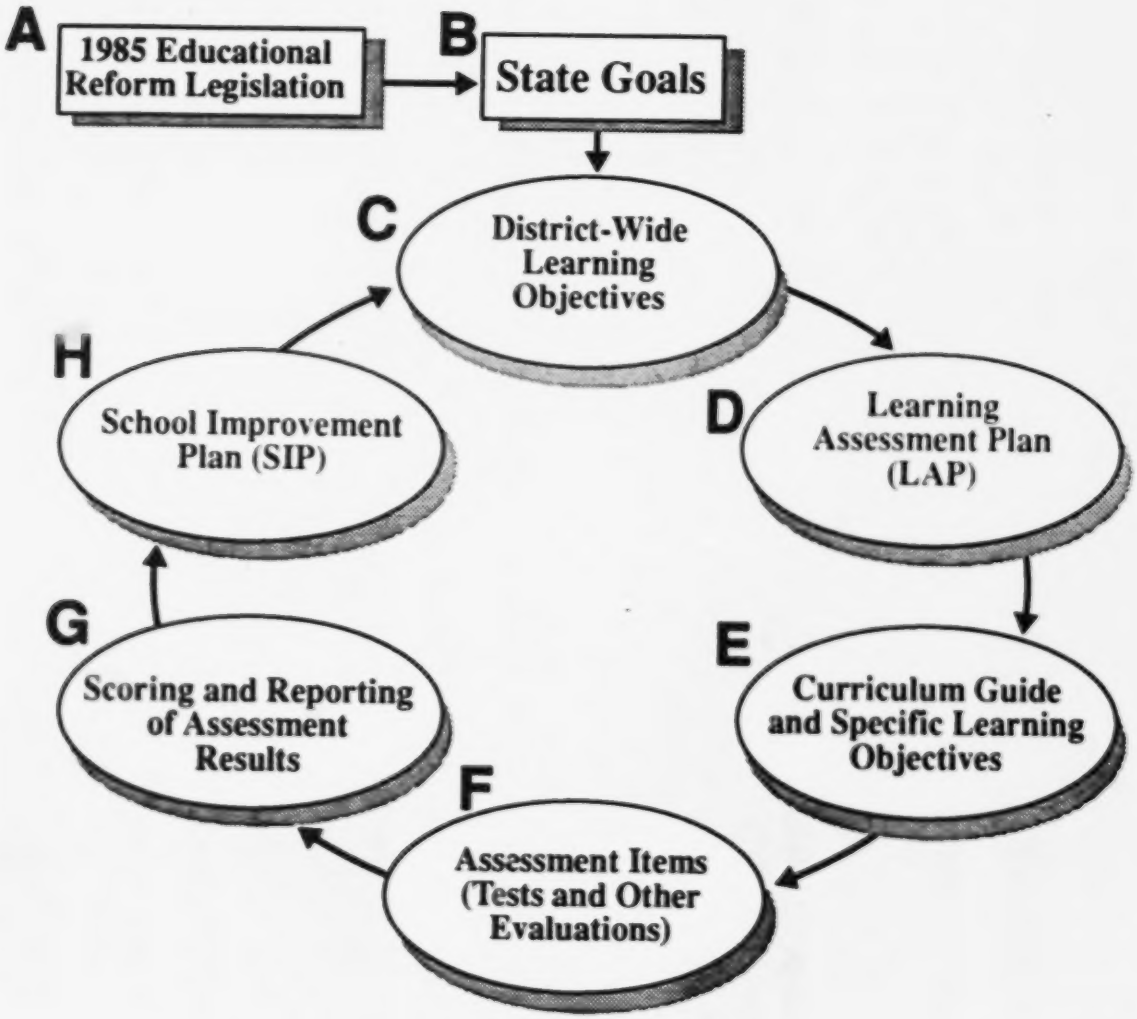

Development of this manual has been funded by the
Illinois State Board of Education
Department of School Improvement Services